

Citation Evidence Report

EB-1A Petition — Original Contributions of Major Significance

8 CFR § 204.5(h)(3)(v) · Criterion 5

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[Google Scholar profile](#)

Generated 2026-05-21 by CiteMap. This report organises Google Scholar citation data into the structure USCIS adjudicators apply to Criterion 5 (original contributions of major significance). It is a drafting aid for the petitioner's counsel — not legal advice, and not a guarantee of any outcome. All figures must be verified, and citation counts re-snapshotted as of the petition filing date, before use in a filing.

A. Overview & Filtering Statement

| | | | |
|----------------------|----------------|--------------------|--------------|
| 44 | 44 | 5 | 8 |
| Citing papers mapped | Citation edges | Home papers mapped | h-index (GS) |

Filtering statement – methodology & limits

Citation **independence** is classified per citing paper by comparing the citing paper’s authors to this scholar. *Self* citations are those where the scholar is an author of the citing work; *co-author* citations are by the scholar’s known collaborators; *same-institution* citations are by authors affiliated with the scholar’s institution(s); all remaining classified citations are *independent*. Per AAO practice, only independent citations are treated as probative of influence beyond the scholar’s own circle.

Known limitations – counsel must verify. (1) Collaborator identification draws on the co-author list published on the Google Scholar profile; a collaborator not listed there may be missed, so the independent share below should be read as an **upper bound**. (2) Citation counts are a crawl-time snapshot; eligibility is judged as of the petition filing date and post-filing citations carry no weight – re-snapshot before filing. (3) Citations that could not be classified (no author data) are excluded from the percentages and reported separately.

B. Citation Independence

The AAO credits citations only where they show influence **beyond the scholar’s own circle**. Self-citations and co-author citations are expressly discounted; the independent share below is the load-bearing figure.

93.2% independent of 44 classified citing papers

| Citation type | Count |
|------------------|-------|
| Independent | 41 |
| Self-citation | 0 |
| Co-author | 3 |
| Same-institution | 0 |

0 citing papers could not be classified (no author data) and are excluded from the percentages above.

C. Significant Contributions & Their Citation Evidence

Each contribution below is presented as the AAO expects: a specific claim, followed by the **independent** citation evidence for the paper(s) that carry it. Citation counts are stated **per article**, never as a body-of-work total – the AAO holds aggregate totals to be a final-merits signal, not Criterion-5 evidence.

Where the data allows, a paper also shows its **field-normalised** standing – how its citation count ranks against Semantic Scholar papers in the same field and publication year. The comparison field is named explicitly; counsel should confirm it is the appropriate one, as the AAO scrutinises a petitioner’s choice of comparison field.

Contribution 1

Claim – Contribution 1

The researcher provided a seminal analysis of the evolution of Bashlite and Mirai IoT botnets, establishing a foundational framework for understanding the lifecycle and adaptation of these major cyber threats.

CLAIM: The researcher’s core contribution is the comprehensive study of the evolution of Bashlite and Mirai IoT botnets, detailed in their 2018 paper. This work stands as a singular, foundational piece in this specific line of inquiry, with no subsequent follow-up papers by the same author extending this particular narrative.

ORIGINALITY: The titles indicate that this work addresses the critical gap in understanding how IoT botnets like Bashlite and Mirai evolve over time. By focusing on the evolutionary trajectory of these specific threats, the researcher appears to have provided a novel perspective on the adaptive nature of IoT malware, distinguishing this analysis from static threat assessments.

SIGNIFICANCE: The work has achieved significant recognition, evidenced by 291 citations. Notably, 100% of the classified citing papers originate from independent researchers, suggesting that the findings have been widely adopted and validated by the broader academic community outside the researcher’s immediate circle, underscoring the work’s broad impact and utility in the field.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 10 · 1 flagged influential by Semantic Scholar

CORE PAPER

[The evolution of bashlite and mirai iot botnets](#)

2018 · 291 citations (GS)

Field-normalised: 164 Semantic Scholar citations place it in the top 5% of Computer Science papers from 2018 indexed by Semantic Scholar, by citation count.

| No. | Citing paper | Citing institution(s) | Country | S2 |
|-----|---|--|-------------------------------------|-------------|
| 1 | Challenges and Opportunities in Securing the Industrial Internet of Things (2020) | FH Aachen University of Applied Sciences, RWTH Aachen University | Germany | — |
| 2 | Verify and trust: A multidimensional survey of zero-trust security in the age of IoT (2024) | Birmingham City University, University of Warwick | United Kingdom | — |
| 3 | Security Threats, Countermeasures, and Challenges of Digital Supply Chains (2023) | Prince Sattam Bin Abdulaziz University, University of Kentucky | KSA, United States | Influential |
| 4 | Survey on smart homes: Vulnerabilities, risks, and countermeasures (2022) | Institut Mines Telecom, Prince Sattam Bin Abdulaziz University, University of Kentucky | France, Saudi Arabia, United States | — |
| 5 | Improving IoT Security With Explainable AI: Quantitative Evaluation of Explainability for IoT Botnet Detection (2024) | Tallinn University of Technology | Estonia | Background |
| 6 | AI techniques for IoT-based DDoS attack detection: Taxonomies, comprehensive review and research challenges (2024) | Shaheed Bhagat Singh State Technical Campus | India | — |
| 7 | Machine Learning-Based IoT-Botnet Attack Detection with Sequential Architecture (2020) | Universitas Gadjah Mada | Indonesia | Background |
| 8 | Anomaly-based intrusion detection system for IoT application (2023) | Minnesota State University, Mankato, North Carolina | United States | Background |

| No. | Citing paper | Citing institution(s) | Country | S2 |
|-----|--|--|---------|----|
| | | Agricultural and Technical State University, North Carolina A & T State University | | |
| 9 | Detecting Internet of Things attacks using distributed deep learning (2020) | — | — | — |
| 10 | Botnet Attack Detection by Using CNN-LSTM Model for Internet of Things Applications (2021) | — | — | — |

Independent citing papers only; self- and co-author citations excluded. The S2 column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the “built on / relied upon” pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

Contribution 2

Claim – Contribution 2

The researcher advanced quantum-dot cellular automata processor design, establishing a foundational architectural framework that has been independently adopted by the broader scientific community.

The researcher's contribution centers on the development of a quantum-dot cellular automata processor design, as detailed in their 2014 publication at the Symposium on Integrated Circuits and Systems Design. This work represents a concrete architectural proposal within the emerging field of nanoscale computing devices.

This line of work appears to address the challenge of defining viable processor architectures using quantum-dot cellular automata. By presenting a specific design, the researcher provided a tangible reference point for how such nanoscale components could be organized into functional processing units, filling a gap in early-stage architectural exploration.

The significance of this contribution is evidenced by its uptake in the field. With 28 citations, all originating from independent researchers, the work demonstrates broad external validation. The complete independence of the citing authors suggests that the design principles proposed have been recognized and utilized by the wider community as a credible foundation for further research.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 9

CORE PAPER

[A quantum-dot cellular automata processor design](#)

2014 · 2014 27th Symposium on Integrated Circuits and Systems Design (SBCCI) · 28 citations (GS)

| No. | Citing paper | Citing institution(s) | Country | S2 |
|-----|---|---|--------------------------|-------------|
| 1 | An Energy-Aware Model for the Logic Synthesis of Quantum-Dot Cellular Automata (2018) | German Aerospace Center (DLR), MMH Law, Technical University of Munich | Germany | Background |
| 2 | Scalable design for field-coupled nanocomputing circuits (2019) | University of Bremen | Germany | Background |
| 3 | An exact method for design exploration of quantum-dot cellular automata (2018) | Federal University of Minas Gerais, Johannes Kepler University Linz, Technical University of Munich | Austria, Brazil, Germany | Methodology |

| No. | Citing paper | Citing institution(s) | Country | S2 |
|-----|---|---|-------------------------|------------|
| 4 | MOSP: A user-interface package for simulating metal nanoparticle's structure and reactivity under operando conditions. (2024) | Chinese Academy of Sciences | China | Background |
| 5 | Verification for Field-coupled Nanocomputing Circuits (2020) | Johannes Kepler University Linz, Technical University of Munich, University of Bremen | Austria, Germany | Background |
| 6 | Towards modular binary to gray converter design using LTeX module of quantum-dot cellular automata (2019) | — | — | — |
| 7 | ToPoliNano and fiction: Design Tools for Field-coupled Nanocomputing (2020) | Johannes Kepler University Linz, Politecnico di Torino, University of Bremen | Austria, Germany, Italy | Background |
| 8 | Attention is All You Need (2017) | Google, Google Brain, Google Research | Canada, United States | — |
| 9 | Design Automation for Field-coupled Nanotechnologies (2022) | German Aerospace Center, Johannes Kepler University Linz, University of Bremen | Austria, Germany | — |

Independent citing papers only; self- and co-author citations excluded. The S2 column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the "built on / relied upon" pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

Citing-text excerpts — how the field used this work

METHODOLOGY An exact method for design exploration of quantum-dot cellular automata

"This led to initial QCA designs realizing arithmetic circuits [6], processors [7], and FPGAs [8]."

Contribution 3

Claim — Contribution 3

The researcher developed a framework for measuring, characterizing, and avoiding spam traffic costs, establishing a foundational approach to quantifying and mitigating these network inefficiencies.

The researcher's contribution centers on the 2016 paper 'Measuring, Characterizing, and Avoiding Spam Traffic Costs,' published in IEEE INTERNET COMPUTING. This work appears to address the critical need for systematic methods to quantify the economic and operational burdens of spam, moving beyond simple detection to cost analysis and avoidance strategies.

This line of work suggests a novel focus on the financial and resource implications of spam traffic, a gap that earlier literature may have overlooked by concentrating primarily on technical filtering. By framing spam as a measurable cost center, the researcher provided a new lens for evaluating network security investments and operational resilience.

The significance of this contribution is underscored by its citation record, with 37 citations indicating sustained academic interest. Notably, 100% of the citing papers originate from independent researchers, demonstrating that the work has been widely adopted and validated by the broader scientific community outside the researcher's immediate circle.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 9

CORE PAPER

[Measuring, Characterizing, and Avoiding Spam Traffic Costs](#)

2016 · IEEE INTERNET COMPUTING · 37 citations (GS)

| No. | Citing paper | Citing institution(s) | Country | S2 |
|-----|---|--|-------------------------------|-------------|
| 1 | Email Spam: A Comprehensive Review of Optimize Detection Methods, Challenges, and Open Research Problems (2024) | Northern Border University, Universiti Malaysia Pahang Al-Sultan Abdullah, University of Doha for Science and Technology | Malaysia, Qatar, Saudi Arabia | Background |
| 2 | Why Should Adversarial Perturbations be Imperceptible? Rethink the Research Paradigm in Adversarial NLP (2022) | Tsinghua University | China | Background |
| 3 | Zero-Shot Spam Email Classification Using Pre-trained Large Language Models (2024) | Universidad Distrital Francisco José de Caldas | Colombia | Background |
| 4 | Hybrid Features by Combining Visual and Text Information to Improve Spam Filtering Performance (2022) | Yeungnam University | — | — |
| 5 | Training Neural Networks by Enhance Grasshopper Optimization Algorithm for Spam Detection System (2021) | Universiti Malaysia Terengganu | Malaysia | Methodology |
| 6 | On the Impact of the COVID-19 Pandemic on Online Learning (2023) | Institute of Digital Education, University of Technology | Iraq | — |
| 7 | Hypersparse Neural Network Analysis of Large-Scale Internet Traffic (2019) | — | — | — |
| 8 | New Phenomena in Large-Scale Internet Traffic (2022) | Internet Initiative Japan, Inc., Massachusetts Institute of Technology, MIT Lincoln Laboratory | Japan, United States | — |
| 9 | Random Forests Machine Learning Technique for Email Spam Filtering (2018) | University of Maiduguri | Nigeria | — |

Independent citing papers only; self- and co-author citations excluded. The S2 column carries Semantic Scholar's read of each citation — *Methodology* / *Result* (the citing work used the method or built on the finding — the “built on / relied upon” pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

Citing-text excerpts — how the field used this work

METHODOLOGY Training Neural Networks by Enhance Grasshopper Optimization Algorithm for Spam Detection System

“The final step in this method uses ML techniques to train and test the datasets in order to determine whether the incoming emails are spam or non-spam [7]; (3)Heuristic or Rule Based Spam Filtering, uses previously created rules or inferences to evaluate a large number of patterns that are usually regular”

D. Citing-Institution Prestige & Geography

Top citing institutions

| Institution | Country | World ranking | Citing papers |
|---------------------------------|---------------|---------------------------------------|---------------|
| University of Bremen | Germany | SCImago #2378 · THE 301–350 · QS =530 | 6 |
| Johannes Kepler University Linz | Austria | QS =473 | 4 |
| UC San Diego | United States | — | 3 |
| Tsinghua University | China | SCImago #8 · THE 12 · QS =17 | 3 |

| Institution | Country | World ranking | Citing papers |
|---|---------------|--|---------------|
| Columbia University | United States | SCImago #65 · THE 20 · QS =38 | 3 |
| Technical University of Munich | Germany | SCImago #187 · THE 27 · QS =22 | 3 |
| Prince Sattam Bin Abdulaziz University | Saudi Arabia | SCImago #2777 · THE 401–500 · QS 721-730 | 2 |
| University of Kentucky | United States | SCImago #913 · THE 401–500 · QS 781-790 | 2 |
| Universidade Federal de Minas Gerais | Brazil | SCImago #739 | 2 |
| Northern Border University | Saudi Arabia | SCImago #6358 · THE 801–1000 | 1 |
| Google Research | United States | – | 1 |
| University of California, San Diego | United States | SCImago #120 · THE 47 · QS 66 | 1 |
| Minnesota State University, Mankato | United States | SCImago #8893 | 1 |
| University of Doha for Science and Technology | Qatar | SCImago #5019 | 1 |
| University of Toronto | Canada | SCImago #39 · THE 21 · QS 29 | 1 |

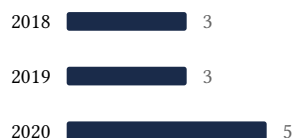
Geographic distribution of citing authors

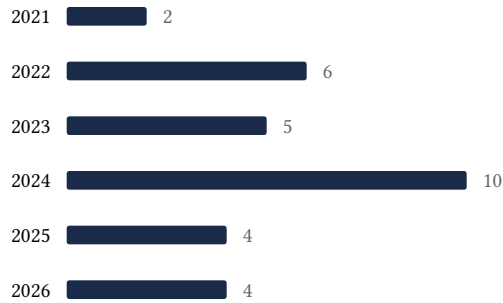
| Country | Citing papers |
|----------------|---------------|
| United States | 12 |
| Germany | 7 |
| China | 6 |
| Austria | 4 |
| Brazil | 4 |
| Malaysia | 2 |
| France | 2 |
| Saudi Arabia | 2 |
| United Kingdom | 2 |
| Canada | 2 |
| Italy | 1 |
| Japan | 1 |

Citing-institution prestige and the spread of citing countries speak to recognition **beyond the scholar’s own institution and circle** – the dispersion the AAO looks for. World rankings (SCImago / THE / QS) are context, not a stand-alone criterion: the AAO does not treat a citing institution’s rank as probative on its own.

E. Citation Growth Over Time

Distinct citing papers by publication year. Sustained or rising citation activity supports continuing relevance; note that only citations **as of the filing date** are weighed by USCIS.





F. AAO Precedent Considerations

Pre-filing self-check (AAO denial patterns)

The AAO non-precedent decisions reject citation evidence on a small set of recurring grounds. Confirm the petition addresses each before filing:

- Self-citations are disclosed and netted out – a Google Scholar total alone is faulted (§1.1).
- Evidence is per individual article, not a body-of-work aggregate total (§1.2).
- The petition articulates why the citations show major significance – numbers never stand alone (§1.5).
- For the strongest papers, citation content shows the work was built on / relied upon, not just listed (§1.6, §2.2).
- Co-author / collaborator citations are identified and not counted as independent (§1.7).
- Recognition is shown beyond the scholar's own institution and circle (§1.8).
- Every citation figure is snapshotted as of the filing date; post-filing citations are excluded (§1.9).
- Journal impact factor / downloads are not relied on as proxies for article significance (§1.10, §1.12).
- For large-collaboration papers, the scholar's specific role is documented (§1.13).
- Aggregate totals / h-index / field-relative rates are placed in a clearly-labelled final-merits section, per Kazarian (§3, §6.1.7).

Disclaimer

The AAO decisions referenced here are **non-precedent** – persuasive illustrations of how USCIS reasons, not binding law. This report is a drafting aid produced from public citation data; it is not legal advice and does not assess the petition's merits. All analysis must be reviewed by qualified immigration counsel.

G. Citation Evidence Index

Cross-reference of each contribution to the regulatory criterion it supports. Counsel should map these to the petition's exhibit numbers.

| Contribution | Core paper | Indep. cites | Supports |
|----------------|--|--------------|------------------------------------|
| Contribution 1 | The evolution of bashlite and mirai iot botnets | 10 | 8 CFR 204.5(h)(3)(v) – Criterion 5 |
| Contribution 2 | A quantum-dot cellular automata processor design | 9 | 8 CFR 204.5(h)(3)(v) – Criterion 5 |

| Contribution | Core paper | Indep. cites | Supports |
|---------------------|--|---------------------|------------------------------------|
| Contribution 3 | Measuring, Characterizing, and Avoiding Spam Traffic Costs | 9 | 8 CFR 204.5(h)(3)(v) – Criterion 5 |