Database	Query ID	Query String	Hits	Date	Notes	File Path	Name
IEEE Xplore	Q1	("Full Text & Metadata":"Spiking neural network*" OR "Full Text & Metadata":"SNN" OR "Full Text & Metadata":"neuromorphic network*" OR "Full Text & Metadata":"deep spiking network*" OR "Full Text & Metadata":"pulsed neural network*" OR "Full Text & Metadata":"event-driven neural network" OR "Full Text & Metadata":"event-based spiking network") AND ("Full Text & Metadata":"Hybrid ANN-SNN" OR "Full Text & Metadata":"ANN-SNN conversion" OR "Full Text & Metadata":"hybrid neural network*" OR "Full Text & Metadata":"hybrid spiking network*" OR "Full Text & Metadata":"artificial and spiking neural network*") AND ("Full Text & Metadata":"Learnable encoding" OR "Full Text & Metadata":"Adaptive encoding" OR "Full Text & Metadata":"learnable spike encoding" OR "Full Text & Metadata":"adaptive spike encoding" OR "Full Text & Metadata":"trainable encoder" OR "Full Text & Metadata":"differentiable encoding" OR "Full Text & Metadata":"plastic encoding" OR "Full Text & Metadata":"adaptive threshold encoding" OR "Full Text & Metadata":"learnable threshold" OR "Full Text & Metadata":"surrogate gradient")	13	Nov-25	Advanced search (Full Text & Metadata); Filters Applied: Journals + Early Access+ open access only+ Articles 01/01/2015 - 11/07/2025	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q1"	ieee_q1.bib
ACM Digital Library	Q1	("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("Hybrid ANN-SNN" OR "ANN-SNN conversion" OR "hybrid neural network*" OR "hybrid spiking network*" OR "artificial and spiking neural network*") AND ("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient")	18	Nov-25	Advanced Search: Search within anywhere; Custom Range (jan-2015; Nov-2025)	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q1"	acm_q1.bib
Scopus	Q1	("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("Hybrid ANN-SNN" OR "ANN-SNN conversion" OR "hybrid neural network*" OR "hybrid spiking network*" OR "artificial and spiking neural network*") AND ("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient")	25	Nov-25	Q1 searched across three fields: (1) All fields – spiking or neuromorphic neural network terms, (2) All fields – hybrid ANN–SNN or conversion terms, and (3) Article title, Abstract, Keywords – learnable/adaptive encoding terms. Filter: Open Access; (2015-2025,English)	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q1"	scopus_q1.bib

Source	Query	Search string	Count	Date	Notes	Path	File
ScienceDirect	Q1	("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient") ("Spiking neural network" OR "SNN" OR "neuromorphic network" OR "deep spiking network" OR "pulsed neural network" OR "event-driven neural network" OR "event-based spiking network") ("Hybrid ANN-SNN" OR "ANN-SNN conversion" OR "hybrid neural network" OR "hybrid spiking network" OR "artificial and spiking neural network")	2	Nov-25	Q1 searched across three fields: (1) All fields – learnable/adaptive encoding terms, (2) Title/Abstract/Keywords – SNN-related terms, and (3) Title – hybrid ANN–SNN terms. Open Access filter not applide; so all 2 not open access.	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q1"	scidir_q1.bib
SpringerLink	Q1	("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("Hybrid ANN-SNN" OR "ANN-SNN conversion" OR "hybrid neural network*" OR "hybrid spiking network*" OR "artificial and spiking neural network*") AND ("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient")	11	Nov-25	advanced search across all fields (title, abstract, keywords, and full text); Filters: custom dates (2015-2025); English; Open access	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q1"	springer_q1.bib
arXiv.org	Q1	("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("Hybrid ANN-SNN" OR "ANN-SNN conversion" OR "hybrid neural network*" OR "hybrid spiking network*" OR "artificial and spiking neural network*") AND ("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient")	5	Nov-25	advanced search across all fields (title, abstract, keywords, and full text); custom dates (2015-2025)	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q1"	acm_q1.bib

Database	Q	Search String	Results	Date	Notes	Location	File
IEEE Xplore	Q2	("Full Text & Metadata":"Learnable encoding" OR "Full Text & Metadata":"Adaptive encoding" OR "Full Text & Metadata":"learnable spike encoding" OR "Full Text & Metadata":"adaptive spike encoding" OR "Full Text & Metadata":"trainable encoder" OR "Full Text & Metadata":"differentiable encoding" OR "Full Text & Metadata":"plastic encoding" OR "Full Text & Metadata":"adaptive threshold encoding" OR "Full Text & Metadata":"learnable threshold" OR "Full Text & Metadata":"surrogate gradient") AND ("Full Text & Metadata":"event-based dataset*" OR "Full Text & Metadata":"DVS Gesture" OR "Full Text & Metadata":"N-MNIST" OR "Full Text & Metadata":"SHD" OR "Full Text & Metadata":"Spiking Heidelberg Digits" OR "Full Text & Metadata":"CIFAR-10-DVS" OR "Full Text & Metadata":"neuromorphic benchmark") AND ("Full Text & Metadata":"TTFS" OR "Full Text & Metadata":"time-to-first-spike" OR "Full Text & Metadata":"static" OR "Full Text & Metadata":"hand-crafted" OR "Full Text & Metadata":"conventional" OR "Full Text & Metadata":"rule-based" OR "Full Text & Metadata":"traditional encoding" OR "Full Text & Metadata":"rate" OR "Full Text & Metadata":"temporal encoding" OR "Full Text & Metadata":"population encoding" OR "Full Text & Metadata":"direct encoding" OR "Full Text & Metadata":"latency" OR "Full Text & Metadata":"fixed threshold" OR "Full Text & Metadata":"non-adaptive" OR "Full Text & Metadata":"Poisson")	18	Nov-25	Advanced search (Full Text & Metadata); Filters Applied: Journals + Early Access+ open access only+ Articles 01/01/2015 - 11/07/2025	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q2"	ieee_q2.bib
ACM Digital Library	Q2	("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient") AND ("event-based dataset*" OR "DVS Gesture" OR "N-MNIST" OR "SHD" OR "Spiking Heidelberg Digits" OR "CIFAR-10-DVS" OR "neuromorphic benchmark") AND ("TTFS" OR "time-to-first-spike" OR "static" OR "hand-crafted" OR "conventional" OR "rule-based" OR "traditional encoding" OR "rate" OR "temporal encoding" OR "population encoding" OR "direct encoding" OR "latency" OR "fixed threshold" OR "non-adaptive" OR "Poisson")	17	Nov-25	Advanced Search: Search within anywhere; filters: Proceedings, Research Article, January 2015 - November 2025	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q2"	acm_q2.bib

Database	Quartile	Query	Count	Date	Notes	Path	File
Scopus	Q2	TITLE-ABS-KEY (("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient") AND ("event-based dataset*" OR "DVS Gesture" OR "N-MNIST" OR "SHD" OR "Spiking Heidelberg Digits" OR "CIFAR-10-DVS" OR "neuromorphic benchmark") AND ("TTFS" OR "time-to-first-spike" OR "static" OR "hand-crafted" OR "conventional" OR "rule-based" OR "traditional encoding" OR "rate" OR "temporal encoding" OR "population encoding" OR "direct encoding" OR "latency" OR "fixed threshold" OR "non-adaptive" OR "Poisson")) AND PUBYEAR > 2014 AND PUBYEAR < 2025 AND (LIMIT-TO (OA , "all") OR LIMIT-TO (OA , "publisherfullgold") OR LIMIT-TO (OA , "repository")) AND (LIMIT-TO (LANGUAGE , "English"))	4	Nov-25	Advanced search (TITLE-ABS-KEY); filter applied: limited to English, All open access => includes Gold, Green, Hybrid gold	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q2"	scopus_q2.bib
ScienceDirect	Q2	("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient") ("event-based dataset" OR "DVS Gesture" OR "N-MNIST" OR "SHD" OR "Spiking Heidelberg Digits" OR "CIFAR-10-DVS") AND ("TTFS" OR "time-to-first-spike" OR "static")	2	Nov-25	Q2 searched using two sub-queries: (1) Title/Abstract/Keywords – learnable/adaptive encoding terms, and (2) All Fields – event-based dataset and temporal-encoding terms (e.g., TTFS, static). Filter: Open Access.	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q2"	scidir_q2.bib
SpringerLink	Q2	("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient") AND ("event-based dataset*" OR "DVS Gesture" OR "N-MNIST" OR "SHD" OR "Spiking Heidelberg Digits" OR "CIFAR-10-DVS" OR "neuromorphic benchmark") AND ("TTFS" OR "time-to-first-spike" OR "static" OR "hand-crafted" OR "conventional" OR "rule-based" OR "traditional encoding" OR "rate" OR "temporal encoding" OR "population encoding" OR "direct encoding" OR "latency" OR "fixed threshold" OR "non-adaptive" OR "Poisson")	15	Nov-25	advanced search across all fields (title, abstract, keywords, and full text); limited to publications written in English, published between 2015 and 2025, and classified as Articles, Research Articles, Conference Papers, or Review Articles. The Open Access filter was also applied to ensure accessibility.	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q2"	springer_q2.bib

Source	Query ID	Query	Results	Date	Search Details	Path	File
arXiv.org	Q2	("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient") AND ("event-based dataset*" OR "DVS Gesture" OR "N-MNIST" OR "SHD" OR "Spiking Heidelberg Digits" OR "CIFAR-10-DVS" OR "neuromorphic benchmark") AND ("TTFS" OR "time-to-first-spike" OR "static" OR "hand-crafted" OR "conventional" OR "rule-based" OR "traditional encoding" OR "rate" OR "temporal encoding" OR "population encoding" OR "direct encoding" OR "latency" OR "fixed threshold" OR "non-adaptive" OR "Poisson")	5	Nov-25	advanced search across all fields (title, abstract, keywords, and full text); custom dates (2015-2025)	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q2"	arxiv_q2.bib
IEEE Xplore	Q3	("Full Text & Metadata":"event-based dataset*" OR "Full Text & Metadata":"DVS Gesture" OR "Full Text & Metadata":"N-MNIST" OR "Full Text & Metadata":"SHD" OR "Full Text & Metadata":"Spiking Heidelberg Digits" OR "Full Text & Metadata":"CIFAR-10-DVS" OR "Full Text & Metadata":"neuromorphic benchmark") AND ("Full Text & Metadata":"software simulation" OR "Full Text & Metadata":"neuromorphic hardware" OR "Full Text & Metadata":"Loihi" OR "Full Text & Metadata":"SpiNNaker" OR "Full Text & Metadata":"TrueNorth" OR "Full Text & Metadata":"BindsNET" OR "Full Text & Metadata":"snnTorch" OR "Full Text & Metadata":"neuromorphic simulator") AND ("Full Text & Metadata":"Learnable encoding" OR "Full Text & Metadata":"Adaptive encoding" OR "Full Text & Metadata":"learnable spike encoding" OR "Full Text & Metadata":"adaptive spike encoding" OR "Full Text & Metadata":"trainable encoder" OR "Full Text & Metadata":"differentiable encoding" OR "Full Text & Metadata":"plastic encoding" OR "Full Text & Metadata":"adaptive threshold encoding" OR "Full Text & Metadata":"learnable threshold" OR "Full Text & Metadata":"surrogate gradient")	15	Nov-25	Advanced search (Full Text & Metadata); Filters Applied: Journals + Early Access+ open access only+ Articles 01/01/2015 - 11/07/2025	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q3"	ieee_q3.bib

Database		Query	Count	Date	Notes	Path	Filename
ACM Digital Library	Q3	("event-based dataset*" OR "DVS Gesture" OR "N-MNIST" OR "SHD" OR "Spiking Heidelberg Digits" OR "CIFAR-10-DVS" OR "neuromorphic benchmark") AND ("software simulation" OR "neuromorphic hardware" OR "Loihi" OR "SpiNNaker" OR "TrueNorth" OR "BindsNET" OR "snnTorch" OR "neuromorphic simulator") AND ("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient")	22	Nov-25	Advanced search (Full Text & Metadata); Filters Applied: Journals + Early Access+ open access only+ Articles 01/01/2015 - 11/07/2025	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q3"	acm_q3.bib
Scopus	Q3	TITLE-ABS-KEY (("event-based dataset*" OR "DVS Gesture" OR "N-MNIST" OR "SHD" OR "Spiking Heidelberg Digits" OR "CIFAR-10-DVS" OR "neuromorphic benchmark") AND ("software simulation" OR "neuromorphic hardware" OR "Loihi" OR "SpiNNaker" OR "TrueNorth" OR "BindsNET" OR "snnTorch" OR "neuromorphic simulator") AND ("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient")) AND PUBYEAR > 2019 AND PUBYEAR < 2026 AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (OA , "all") OR LIMIT-TO (OA , "repository") OR LIMIT-TO (OA , "publisherfullgold"))	3	Nov-25	Advanced search (TITLE-ABS-KEY); filter applied: limited to English, All open access => includes Gold, Green, Hybrid gold	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q3"	scopus_q3.bib
ScienceDirect	Q3	"Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient" "event-based dataset" OR "DVS Gesture" OR "N-MNIST" OR "SHD" OR "Spiking Heidelberg Digits" OR "CIFAR-10-DVS" OR "neuromorphic benchmark" OR "software simulation" OR "neuromorphic hardware"	11	Nov-25	Q3 searched across two fields: (1) All Fields – learnable/adaptive encoding terms, and (2) Title/Abstract/Keywords – event-based dataset and neuromorphic system terms (e.g., software simulation, hardware). Filter: Open Access.	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q3"	scidir_q3.bib

SpringerLink	Q3	("event-based dataset*" OR "DVS Gesture" OR "N-MNIST" OR "SHD" OR "Spiking Heidelberg Digits" OR "CIFAR-10-DVS" OR "neuromorphic benchmark") AND ("software simulation" OR "neuromorphic hardware" OR "Loihi" OR "SpiNNaker" OR "TrueNorth" OR "BindsNET" OR "snnTorch" OR "neuromorphic simulator") AND ("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient")	12	Nov-25	advanced search across all fields (title, abstract, keywords, and full text); limited to publications written in English, published between 2015 and 2025, and classified as Articles, Research Articles, Conference Papers, or Review Articles. The Open Access filter was also applied to ensure accessibility.	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q3"	springer_q3.bib
arXiv.org	Q3	("event-based dataset*" OR "DVS Gesture" OR "N-MNIST" OR "SHD" OR "Spiking Heidelberg Digits" OR "CIFAR-10-DVS" OR "neuromorphic benchmark") AND ("software simulation" OR "neuromorphic hardware" OR "Loihi" OR "SpiNNaker" OR "TrueNorth" OR "BindsNET" OR "snnTorch" OR "neuromorphic simulator") AND ("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient")	2	Nov-25	advanced search across all fields (title, abstract, keywords, and full text); custom dates (2015-2025)	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q3"	arxiv_q3.bib
IEEE Xplore	Q4	("All Metadata":"Learnable encoding" OR "All Metadata":"Adaptive encoding" OR "All Metadata":"learnable spike encoding" OR "All Metadata":"adaptive spike encoding" OR "All Metadata":"trainable encoder" OR "All Metadata":"differentiable encoding" OR "All Metadata":"plastic encoding" OR "All Metadata":"adaptive threshold encoding" OR "All Metadata":"learnable threshold" OR "All Metadata":"surrogate gradient") AND ("All Metadata":"Spiking neural network*" OR "All Metadata":"SNN" OR "All Metadata":"neuromorphic network*" OR "All Metadata":"deep spiking network*" OR "All Metadata":"pulsed neural network*" OR "All Metadata":"event-driven neural network" OR "All Metadata":"event-based spiking network") AND ("All Metadata":"software simulation" OR "All Metadata":"neuromorphic hardware" OR "All Metadata":"Loihi" OR "All Metadata":"SpiNNaker" OR "All Metadata":"TrueNorth" OR "All Metadata":"BindsNET" OR "All Metadata":"snnTorch" OR "All Metadata":"neuromorphic simulator")	2	Nov-25	Advanced search (ALL Metadata); Filters Applied: Journals + open access only + Articles 01/01/2015 - 11/07/2025	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q4"	ieee_q4.bib

Source	Quartile	Query	Count	Date	Notes	Path	File
ACM Digital Library	Q4	("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient") AND ("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("software simulation" OR "neuromorphic hardware" OR "Loihi" OR "SpiNNaker" OR "TrueNorth" OR "BindsNET" OR "snnTorch" OR "neuromorphic simulator")	16	Nov-25	Searched for learnable/adaptive encoding terms in All Fields, combined with spiking neural network and hardware/simulation terms searched in the Abstract. Filter: publication years 2015–2025	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q4"	acm_q4.bib
Scopus	Q4	TITLE-ABS-KEY (("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient") AND ("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("software simulation" OR "neuromorphic hardware" OR "Loihi" OR "SpiNNaker" OR "TrueNorth" OR "BindsNET" OR "snnTorch" OR "neuromorphic simulator")) AND PUBYEAR > 2014 AND PUBYEAR < 2026 AND PUBYEAR > 2019 AND PUBYEAR < 2026 AND (LIMIT-TO (OA , "all") OR LIMIT-TO (OA , "publisherfullgold") OR LIMIT-TO (OA , "publisherhybridgold") OR LIMIT-TO (OA , "repository")) AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "cp") OR LIMIT-TO (DOCTYPE , "re")) AND (LIMIT-TO (LANGUAGE , "English"))	22	Nov-25	Queried TITLE-ABS-KEY for three concept blocks — (learnable/adaptive encoding terms) AND (spiking/neuromorphic network terms) AND (software simulation / neuromorphic hardware & tools: Loihi, SpiNNaker, TrueNorth, BindsNET, snnTorch, etc.). Years: 2020–2025 (PUBYEAR > 2019 & < 2026). Access: Open Access only (all OA types: publisher full gold, repository/green, hybrid gold). Language: English. Document types: Article (ar), Conference Paper (cp), Review (re).	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q4"	scopus_q4.bib

Source		Query	Count	Date	Notes	Path	File
ScienceDirect	Q4	("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient") ("software simulation" OR "neuromorphic hardware" OR "Loihi" OR "SpiNNaker" OR "TrueNorth" OR "BindsNET" OR "snnTorch" OR "neuromorphic simulator") ("Spiking neural network" OR "SNN" OR "neuromorphic network" OR "deep spiking network" OR "pulsed neural network" OR "event-driven neural network")	3	Nov-25	Q4 searched across 3 fields: (1) All Fields – learnable/adaptive encoding term; and (2) on Title/Abstract/Keywords software simulation terms ; and (3) searched in Title only: Spiking neural network terms, Filter: Open Access. (2015,2025)	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q4"	scidir_q4.bib
SpringerLink	Q4	("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient") AND ("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("software simulation" OR "neuromorphic hardware" OR "Loihi" OR "SpiNNaker" OR "TrueNorth" OR "BindsNET" OR "snnTorch" OR "neuromorphic simulator")	36	Nov-25	Q4: Queried All Fields; Document type – Article, Research article, Review article; Publication year – 2015 to 2025; Language – English; Access type – Open Access only.	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q4"	springer_q4.bib
arXiv.org	Q4	("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient") AND ("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("software simulation" OR "neuromorphic hardware" OR "Loihi" OR "SpiNNaker" OR "TrueNorth" OR "BindsNET" OR "snnTorch" OR "neuromorphic simulator")	26	Nov-25	Queried the Abstract field only; (2015-2025)	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q4"	arxiv_q4.bib

Source		Query		Count	Date	Notes	Path	File

| IEEE Xplore | Q5 | ("Full Text & Metadata":("Spiking neural network*" OR "Full Text & Metadata":"SNN" OR "Full Text & Metadata":"neuromorphic network*" OR "Full Text & Metadata":"deep spiking network*" OR "Full Text & Metadata":"pulsed neural network*" OR "Full Text & Metadata":"event-driven neural network" OR "Full Text & Metadata":"event-based spiking network")) AND ("Full Text & Metadata":("Hybrid ANN-SNN" OR "Full Text & Metadata":"ANN-SNN conversion" OR "Full Text & Metadata":"hybrid neural network*" OR "Full Text & Metadata":"hybrid spiking network*" OR "Full Text & Metadata":"artificial and spiking neural network*")) AND ("Full Text & Metadata":("event-based dataset*" OR "Full Text & Metadata":"DVS Gesture" OR "Full Text & Metadata":"N-MNIST" OR "Full Text & Metadata":"SHD" OR "Full Text & Metadata":"Spiking Heidelberg Digits" OR "Full Text & Metadata":"CIFAR-10-DVS" OR "Full Text & Metadata":"neuromorphic benchmark")) AND ("Full Text & Metadata":("TTFS" OR "Full Text & Metadata":"time-to-first-spike" OR "Full Text & Metadata":"static" OR "Full Text & Metadata":"hand-crafted" OR "Full Text & Metadata":"conventional" OR "Full Text & Metadata":"rule-based" OR "Full Text & Metadata":"traditional encoding" OR "Full Text & Metadata":"rate" OR "Full Text & Metadata":"temporal encoding" OR "Full Text & Metadata":"population encoding" OR "Full Text & Metadata":"direct encoding" OR "Full Text & Metadata":"latency" OR "Full Text & Metadata":"fixed threshold" OR "Full Text & Metadata":"non-adaptive" OR "Full Text & Metadata":"Poisson")) | 0 | Nov-25 | Queried the Full Text & Metadata field for four concept groups: Spiking, Hybrid architectures ,Datasets , traditnal encoding Field searched: Full Text & Metadata (broad coverage including title, abstract, and indexed metadata). Filters: none applied for year, access type, or language at query stage. | "D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q5" | ieee_q5.bib |
| ACM Digital Library | Q5 | ("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("Hybrid ANN-SNN" OR "ANN-SNN conversion" OR "hybrid neural network*" OR "hybrid spiking network*" OR "artificial and spiking neural network*") AND ("event-based dataset*" OR "DVS Gesture" OR "N-MNIST" OR "SHD" OR "Spiking Heidelberg Digits" OR "CIFAR-10-DVS" OR "neuromorphic benchmark") AND ("TTFS" OR "time-to-first-spike" OR "static" OR "hand-crafted" OR "conventional" OR "rule-based" OR "traditional encoding" OR "rate" OR "temporal encoding" OR "population encoding" OR "direct encoding" OR "latency" OR "fixed threshold" OR "non-adaptive" OR "Poisson") | 11 | Nov-25 | Field searched: All Fields (includes title, abstract, and metadata). Filters: (2015-2025) | "D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q5" | acm_q5.bib |

Database		Query	Count	Date	Details	Path	File
Scopus	Q5	("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("Hybrid ANN-SNN" OR "ANN-SNN conversion" OR "hybrid neural network*" OR "hybrid spiking network*" OR "artificial and spiking neural network*") AND ("event-based dataset*" OR "DVS Gesture" OR "N-MNIST" OR "SHD" OR "Spiking Heidelberg Digits" OR "CIFAR-10-DVS" OR "neuromorphic benchmark") AND ("TTFS" OR "time-to-first-spike" OR "static" OR "hand-crafted" OR "conventional" OR "rule-based" OR "traditional encoding" OR "rate" OR "temporal encoding" OR "population encoding" OR "direct encoding" OR "latency" OR "fixed threshold" OR "non-adaptive" OR "Poisson")	22	Nov-25	Field searched: All Fields (includes title, abstract, and metadata), (2015-2025), open access, english	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q5"	scopus_q5.bib
ScienceDirect	Q5	Spiking neural network OR "SNN" OR "neuromorphic network" OR "deep spiking network" OR "pulsed neural network" OR "event-driven neural network" OR "event-based spiking network" AND ("event-based dataset" OR "neuromorphic benchmark") "TTFS" OR "time-to-first-spike" OR "traditional encoding" OR "rate" OR "temporal encoding" OR "population encoding" OR "fixed threshold" OR "non-adaptive" OR "Poisson" ("Hybrid ANN-SNN" OR "ANN-SNN conversion" OR "hybrid neural network" OR "hybrid spiking network" OR "artificial and spiking neural network")	1	Nov-25	Q5: 3 PARTS =>query execution across three fields: All fields – general SNN and dataset terms. Title/Abstract/Keywords – encoding mechanism terms. Title only – hybrid ANN–SNN relationship terms. Filters Applied: Year range: 2015–2025 Language: English Access type: Open Access	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q5"	scidir_q5.bib
SpringerLink	Q5	("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("Hybrid ANN-SNN" OR "ANN-SNN conversion" OR "hybrid neural network*" OR "hybrid spiking network*" OR "artificial and spiking neural network*") AND ("event-based dataset*" OR "DVS Gesture" OR "N-MNIST" OR "SHD" OR "Spiking Heidelberg Digits" OR "CIFAR-10-DVS" OR "neuromorphic benchmark") AND ("TTFS" OR "time-to-first-spike" OR "static" OR "hand-crafted" OR "conventional" OR "rule-based" OR "traditional encoding" OR "rate" OR "temporal encoding" OR "population encoding" OR "direct encoding" OR "latency" OR "fixed threshold" OR "non-adaptive" OR "Poisson")	6	Nov-25	Filters Applied: Content Type: Article, Research Article, Conference Paper, Review Article Language: English Access Type: Open Access Publication Year Range: 2015 – 2025	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q5"	springer_q5.bib

Source	Query	Search String	Results	Date	Notes	Path	File
arXiv.org	Q5	("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("Hybrid ANN-SNN" OR "ANN-SNN conversion" OR "hybrid neural network*" OR "hybrid spiking network*" OR "artificial and spiking neural network*") AND ("event-based dataset*" OR "DVS Gesture" OR "N-MNIST" OR "SHD" OR "Spiking Heidelberg Digits" OR "CIFAR-10-DVS" OR "neuromorphic benchmark") AND ("TTFS" OR "time-to-first-spike" OR "static" OR "hand-crafted" OR "conventional" OR "rule-based" OR "traditional encoding" OR "rate" OR "temporal encoding" OR "population encoding" OR "direct encoding" OR "latency" OR "fixed threshold" OR "non-adaptive" OR "Poisson")	2	Nov-25	advanced search across all fields (title, abstract, keywords, and full text); custom dates (2015-2025)	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q5"	arxiv_q5.bib
IEEE Xplore	Q6	("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("Hybrid ANN-SNN" OR "ANN-SNN conversion" OR "hybrid neural network*" OR "hybrid spiking network*" OR "artificial and spiking neural network*") AND ("software simulation" OR "neuromorphic hardware" OR "Loihi" OR "SpiNNaker" OR "TrueNorth" OR "BindsNET" OR "snnTorch" OR "neuromorphic simulator")	0	Nov-25	18 after open access filter produce no result	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q6"	ieee_q6.bib
ACM Digital Library	Q6	("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("Hybrid ANN-SNN" OR "ANN-SNN conversion" OR "hybrid neural network*" OR "hybrid spiking network*" OR "artificial and spiking neural network*") AND ("software simulation" OR "neuromorphic hardware" OR "Loihi" OR "SpiNNaker" OR "TrueNorth" OR "BindsNET" OR "snnTorch" OR "neuromorphic simulator")	30	Nov-25	2015- 2025	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q6"	acm_q6.bib
Scopus	Q6	("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("Hybrid ANN-SNN" OR "ANN-SNN conversion" OR "hybrid neural network*" OR "hybrid spiking network*" OR "artificial and spiking neural network*") AND ("software simulation" OR "neuromorphic hardware" OR "Loihi" OR "SpiNNaker" OR "TrueNorth" OR "BindsNET" OR "snnTorch" OR "neuromorphic simulator")	7	Nov-25	Field searched: (title, abstract, and keywords), (2015-2025), open access, english	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q6"	scopus_q6.bib

Source	Query	Search string	Results	Date	Notes	Path	File
ScienceDirect	Q6	"Spiking neural network" OR "SNN" OR "neuromorphic network" OR "deep spiking network" OR "pulsed neural network" OR "event-driven neural network" OR "event-based spiking network" "software simulation" OR "neuromorphic hardware" OR "Loihi" OR "SpiNNaker" OR "TrueNorth" OR "BindsNET" OR "snnTorch" OR "neuromorphic simulator" "Hybrid ANN-SNN" OR "ANN-SNN conversion" OR "hybrid neural network" OR "hybrid spiking network" OR "artificial and spiking neural network"	1	Nov-25	Q5: 3 PARTS =>query execution across three fields: All fields – general SNN terms. Title/Abstract/Keywords – software simulation terms. Title only – hybrid ANN–SNN relationship terms. Filters Applied: Year range: 2015–2025 Language: English Access type: Open Access	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q6"	scidir_q6.bib
SpringerLink	Q6	("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("Hybrid ANN-SNN" OR "ANN-SNN conversion" OR "hybrid neural network*" OR "hybrid spiking network*" OR "artificial and spiking neural network*") AND ("software simulation" OR "neuromorphic hardware" OR "Loihi" OR "SpiNNaker" OR "TrueNorth" OR "BindsNET" OR "snnTorch" OR "neuromorphic simulator")	13	Nov-25	Filter: Open Access. (2015,2025)	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q6"	springer_q6.bib
arXiv.org	Q6	("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("Hybrid ANN-SNN" OR "ANN-SNN conversion" OR "hybrid neural network*" OR "hybrid spiking network*" OR "artificial and spiking neural network*") AND ("software simulation" OR "neuromorphic hardware" OR "Loihi" OR "SpiNNaker" OR "TrueNorth" OR "BindsNET" OR "snnTorch" OR "neuromorphic simulator")	9	Nov-25	Queried the Abstract field only; (2015-2025)	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q6"	arxiv_q6.bib
IEEE Xplore	Q7	("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient")	7	Nov-25	search All ; Filters Applied: open access only+ Articles 01/01/2015 - 11/19/2025	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q7"	ieee_q7.bib

Source	Q	Query	Count	Date	Notes	Path
ACM Digital Library	Q7	("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold" OR "surrogate gradient")	6	Nov-25	(1) All fields – spiking or neuromorphic neural network terms, (2) Abstract – learnable/adaptive encoding terms. 01/01/2015 - 11/19/2025	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q7"
Scopus	Q7	(TITLE-ABS-KEY ("Spiking neural network*" OR SNN OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network")) AND (ABS ("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold")) AND PUBYEAR > 2014 AND PUBYEAR < 2026 AND (LIMIT-TO (OA , "all")) AND (LIMIT-TO (LANGUAGE , "English"))	3	Nov-25	(1) TITLE-ABS-KEY – spiking or neuromorphic neural network terms, (2) Abstract – learnable/adaptive encoding terms. 2015 - 2026 , English	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q7"
ScienceDirect	Q7	("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") ("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold")	0	Nov-25	(1) All fields – spiking or neuromorphic neural network terms, (2) Abstract and title – learnable/adaptive encoding terms. 2015 - 2025 All results not open access	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q7"
SpringerLink	Q7	("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold")	2	Nov-25	(1) All fields – spiking or neuromorphic neural network terms, (2) Abstract – learnable/adaptive encoding terms. 01/01/2015 - 11/19/2025	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q7"
arXiv.org	Q7	("Spiking neural network*" OR "SNN" OR "neuromorphic network*" OR "deep spiking network*" OR "pulsed neural network*" OR "event-driven neural network" OR "event-based spiking network") AND ("Learnable encoding" OR "Adaptive encoding" OR "learnable spike encoding" OR "adaptive spike encoding" OR "trainable encoder" OR "differentiable encoding" OR "plastic encoding" OR "adaptive threshold encoding" OR "learnable threshold")	8	Nov-25	(1) All fields – spiking or neuromorphic neural network terms, (2) Abstract – learnable/adaptive encoding terms. 01/01/2015 - 11/19/2025	"D:\MyMasterDegreeJourney\Second year\Semester 1\Graduation research\Research logs\Q7"

Number of papers from each	
IEEE Xplore	55
Scopus	86
ACM Digital Library	120
ScienceDirect	20
SpringerLink	95
arXiv.org	57
Total	433

Imported

433

Total Duplicates: 193

Resolved:
TA Screening
Deduplicate: 254

Excluded: 210

Full text Included:

So 19 papers got to