[The Hidden Science of Elevators](https://www.popularmechanics.com/technology/infrastructure/a20986/the-hidden-science-of-elevators/)

[Elevator Control System](http://elevation.wikia.com/wiki/Elevator_control_system)

[Optimization of Elevator Services Using ML](https://www.irjet.net/archives/V3/i7/IRJET-V3I7181.pdf)

[Design and Practice of an Elevator Control System Based on PLC](https://dl.acm.org/citation.cfm?id=1441696)

[[GitHub] Elevator Scheduling Simulator](https://github.com/00111000/Elevator-Scheduling-Simulator)

[[GitHub] Deep Reinforcement Learning for Elevator Group Control](https://github.com/nevertiree/ReinElevator)

[[Blog] Elevator Algorithms](https://www.tinyepiphany.com/2009/12/elevator-algorithms.html)

[[Quora] Which algorithm works in building lifts](https://www.quora.com/Which-algorithm-works-in-building-lifts)

[[Quora] What algorithms is used in modern day elevators](https://www.quora.com/What-algorithm-is-used-in-modern-day-elevators)

[[Geeks blog] What algorithm is used in modern day elevators](http://geeksforgeekss.blogspot.com/2016/07/what-algorithm-is-used-in-modern-day.html)

[[Stack-exchange] What algorithm is used by elevators to find the shortest path](https://softwareengineering.stackexchange.com/questions/331692/what-algorithm-is-used-by-elevators-to-find-the-shortest-path-to-travel-floor-or)

[Old classic paper about autonomous elevator optimization using RL](https://papers.nips.cc/paper/1073-improving-elevator-performance-using-reinforcement-learning.pdf)

The state space dimensionality problem was essentially addressed by evaluating Q(s,a) as NN (where s encodes the state) rather than direct, empirical lookup table.

"we employed a team of discrete-event Q-Iearning agents, where each agent is responsible for controlling one elevator car. Q(:z:, a) is defined as the expected infinite discounted return obtained by taking action a in state :z: and then following an optimal policy (Watkins, 1989). Because of the vast number of states, the Q-values are stored in feedforward neural networks. The networks receive some state information as input, and produce Q-value estimates as output."

"our best results were obtained using networks for pure down traffic with 47 input units, 20 hidden sigmoid units, and two linear output units (one for each action value)."

Input essentially encodes current arrivals that weren't picked up yet, and elevators location and motion.

Instead of the locations of the elevators, encoded the "presence factor" in every floor: presence(floor) = how close (location and direction) is each elevator.

Since the model is decentralized, an elevator takes decisions for itself, and this specific one's state was represented in details using 1 binary state per (location,direction).

Classic manual constraints were put on the actions (not sure if for the training, the exploiting or both).

(must open when in a floor where someone wishes to exit; and cannot turn until served all in current motion direction)

Actions model:

when open: close and either up or down.

when moving: either go on or stop and open.

[Swedish thesis that talks a lot and eventually implements choice between several classic algorithms rather than actual new algorithm. not interesting.](https://www.kth.se/social/files/588617c2f276547fe1dbf8d2/AJanssonKUgglaLingvall_dkand15.pdf)

The Swedish thesis talks a lot and eventually implements choice between several classic algorithms rather than actual new algorithm. Irrelevant.

[That's just single elevator;](https://www.sciencedirect.com/science/article/pii/S1474667016392783) relevant references appear in the introduction.

[A Genetic Algorithm Based Elevator Dispatching Method For Waiting Time Optimization](https://www.sciencedirect.com/science/article/pii/S2405896316302671)

[Optimization of waiting and journey time in group elevator system using genetic algorithm](https://ieeexplore.ieee.org/document/6873645)

[Elevators in fully-automated parking structure](https://www.sciencedirect.com/science/article/pii/S187705091503032X)