Recurrent Neural Networks

January 6, 2017

Rajiv shah

RajivShah.com
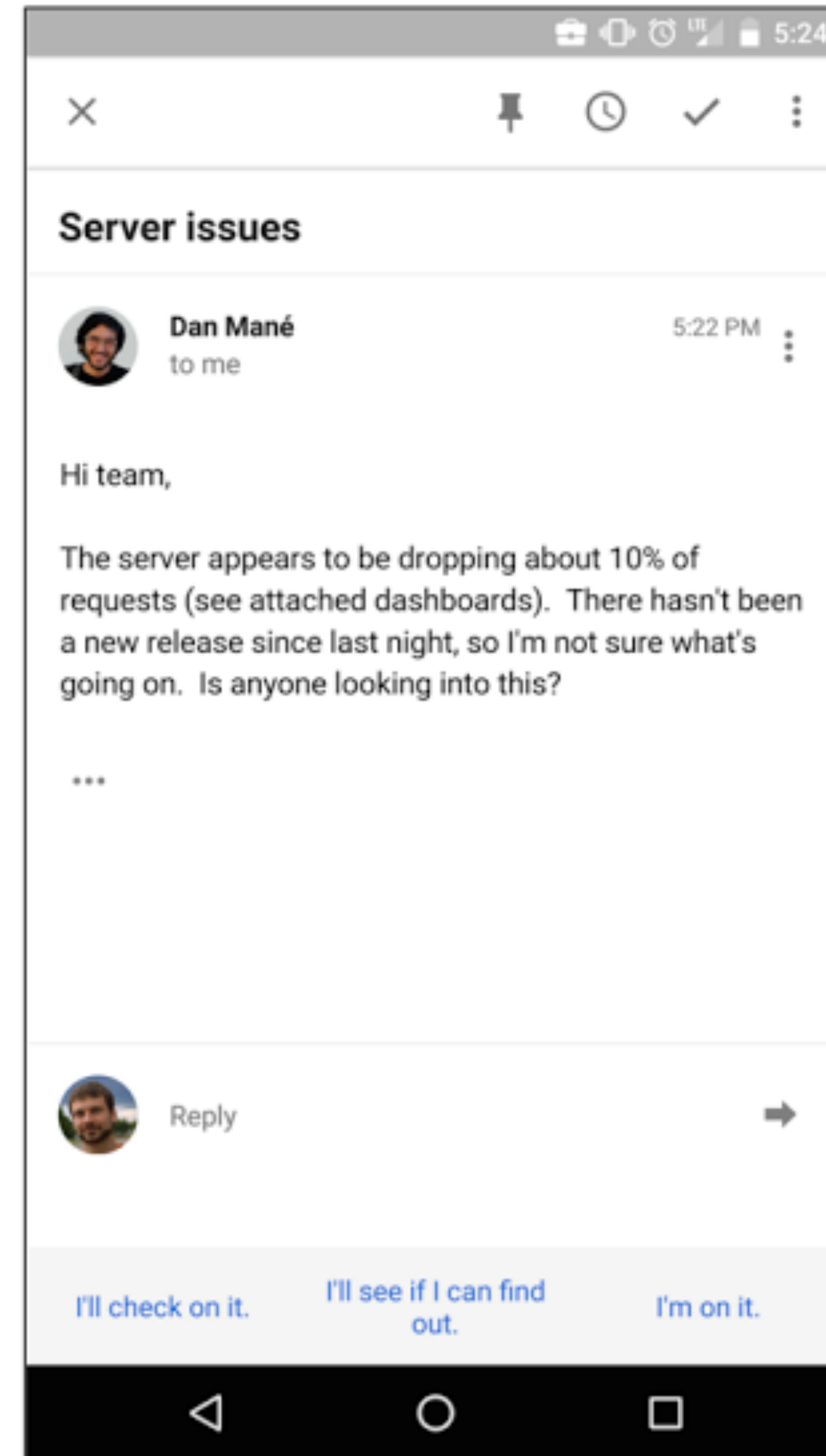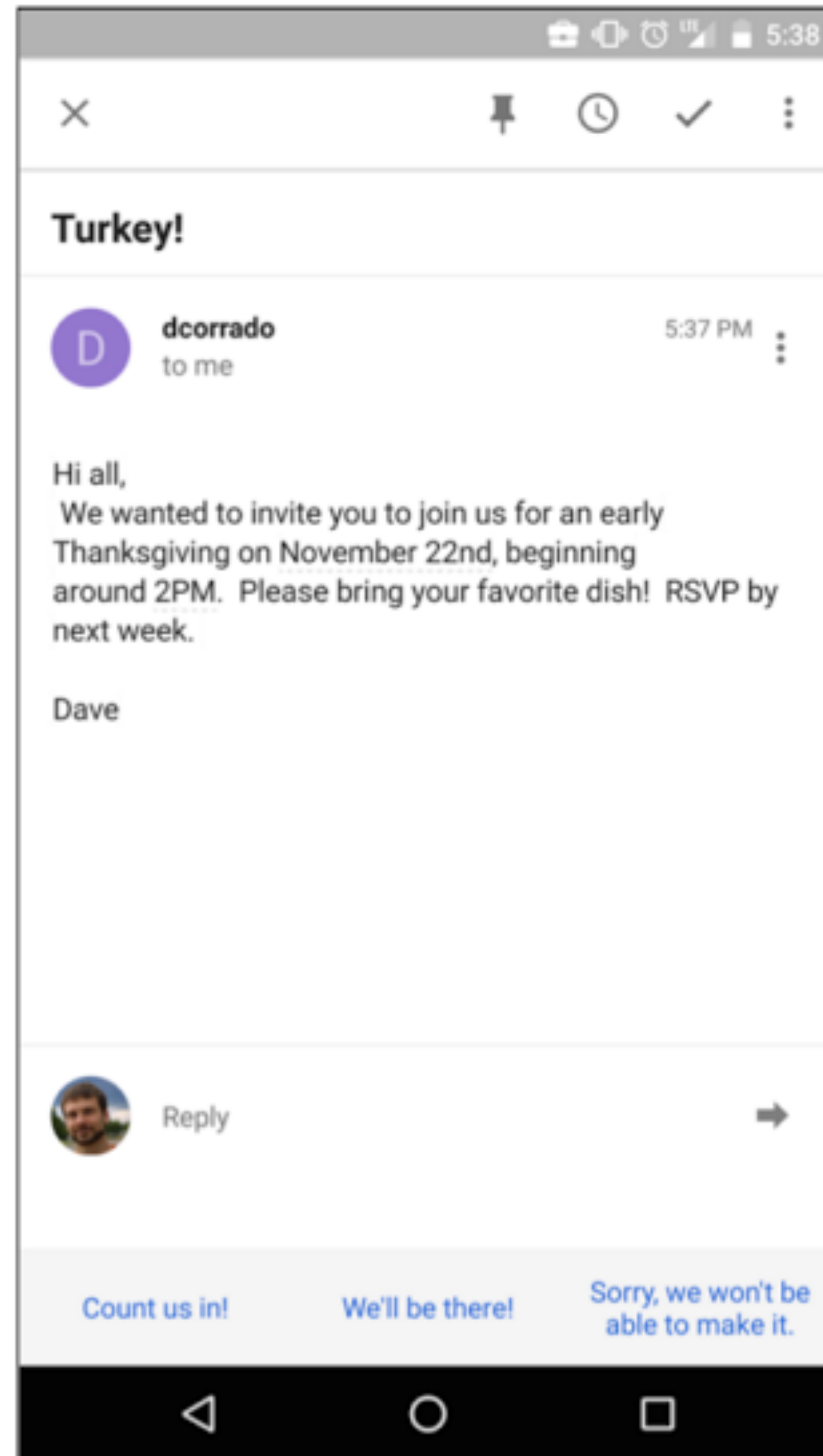rshahATpobox.com
github.com/rajshah4/

rajcs4

- **why**
- **theory**
- **demo**

why?

smart reply

text summarization

Input: Article 1st sentence	Model-written headline
metro-goldwyn-mayer reported a third-quarter net loss of dlrs 16 million due mainly to the effect of accounting rules adopted this year	mgm reports 16 million net loss on higher revenue
starting from july 1, the island province of hainan in southern china will implement strict market access control on all incoming livestock and animal products to prevent the possible spread of epidemic diseases	hainan to curb spread of diseases
australian wine exports hit a record 52.1 million liters worth 260 million dollars (143 million us) in september, the government statistics office reported on monday	australian wine exports hit record high in september

language translation

OLD TRANSLATION

NEW TRANSLATION

kaggle

How Much Did It Rain? II, Winner's Interview: 1st place, PuPa (aka Aaron Sim)

Kaggle Team | 01.04.2016

music

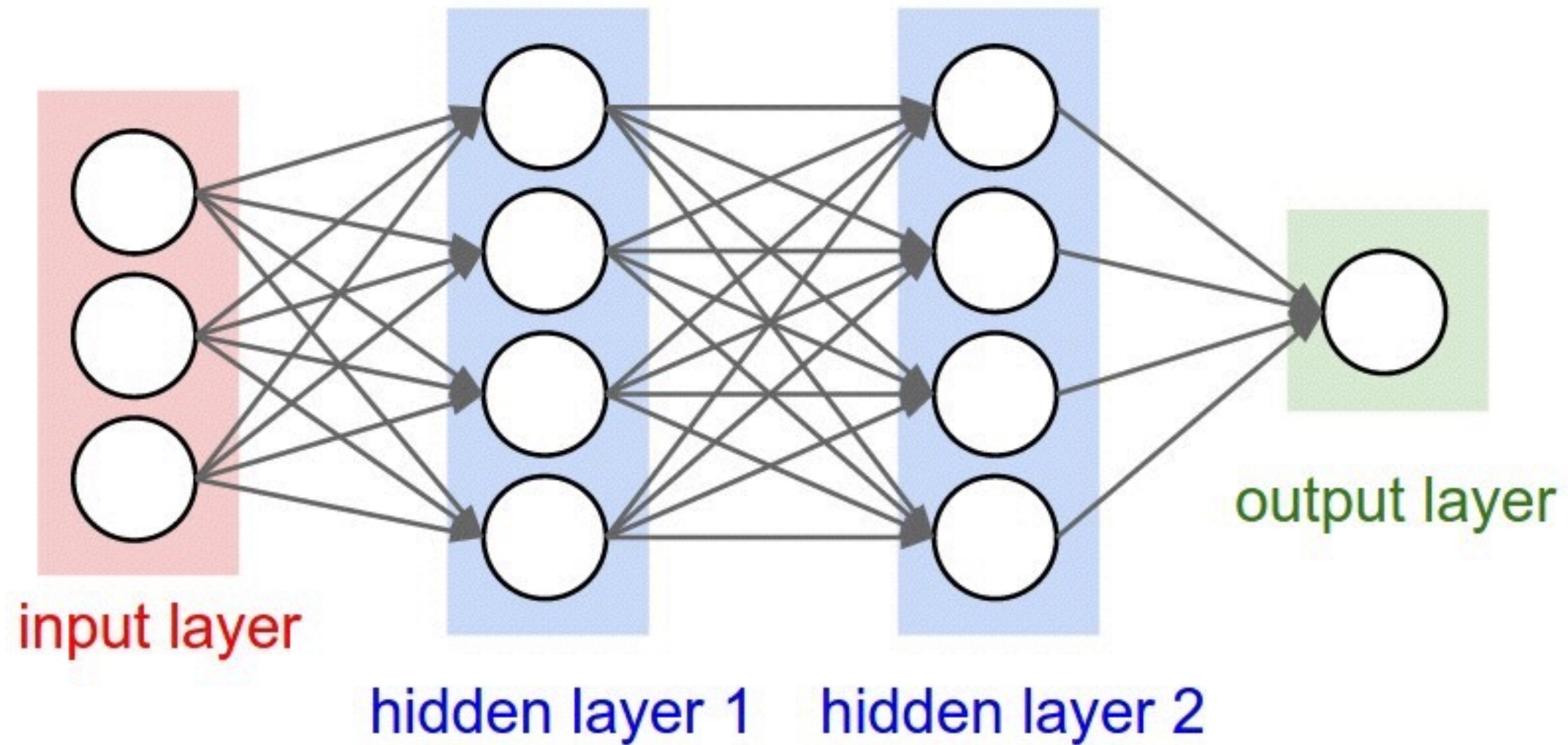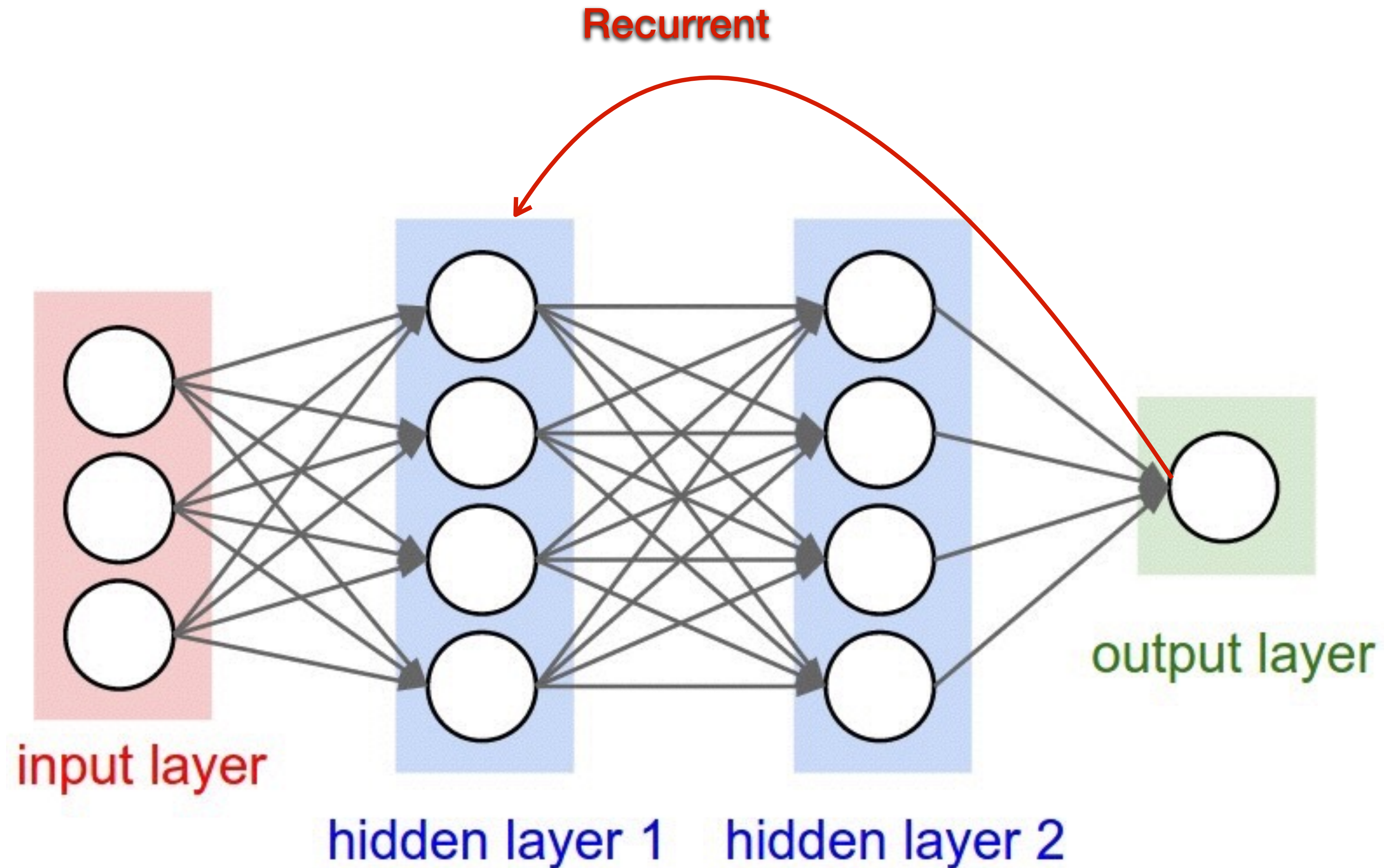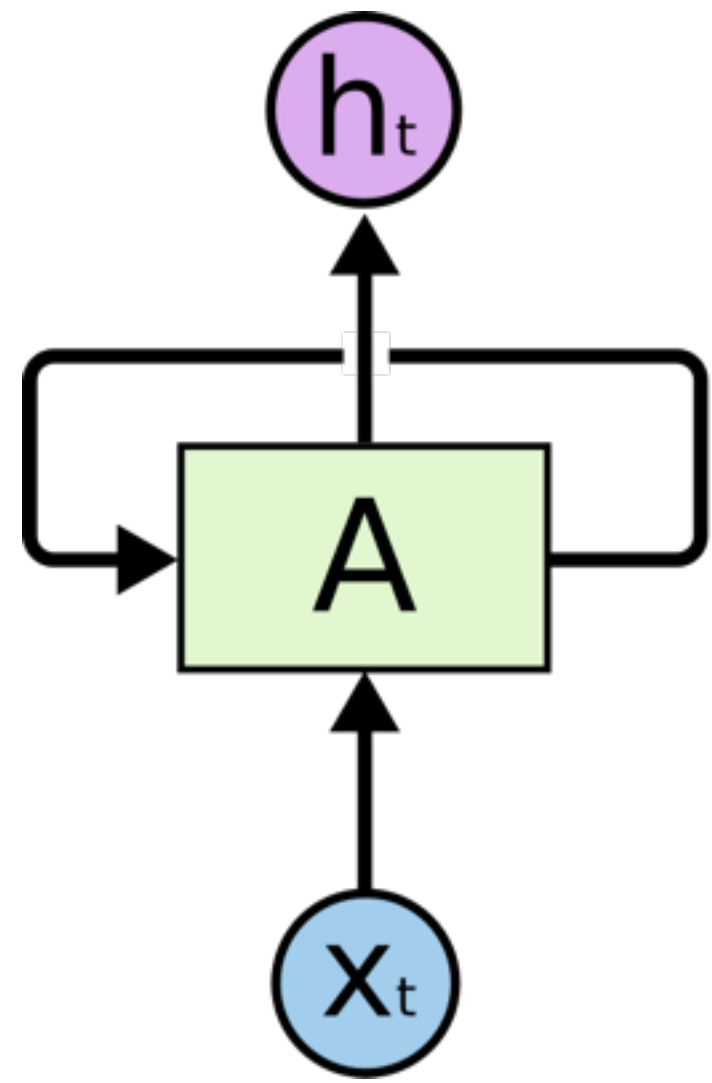# theory: operation

deep learning

input layer

hidden layer 1   hidden layer 2

output layer

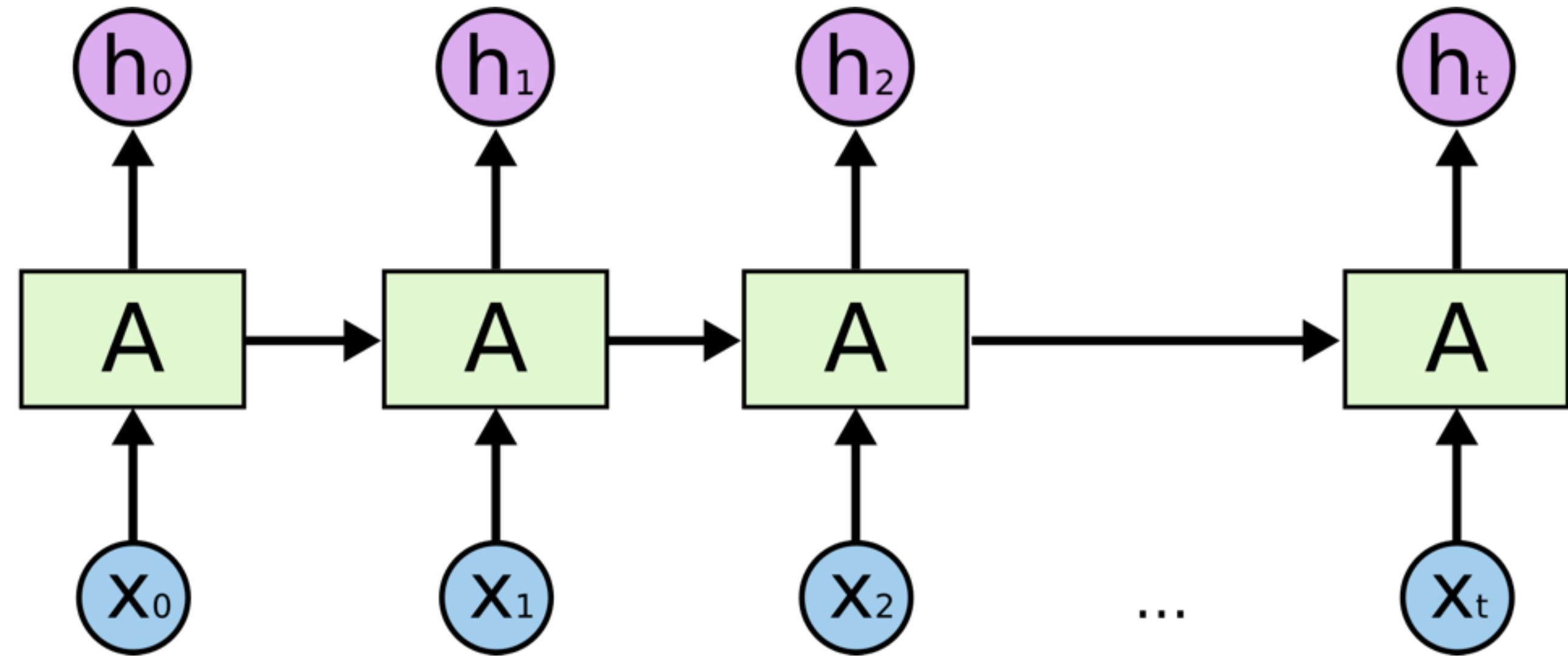# recurrent neural network

# rnn: rolled out

10+3+22   =   10   3   22

# demo: char-rnn

linux kernel

```c
/*
 * Increment the size file of the new incorrect UI_FILTER group information
 * of the size generatively.
 */
static int indicate_policy(void)
{
  int error;
  if (fd == MARN_EPT) {
    /*
     * The kernel blank will coeld it to userspace.
     */
    if (ss->segment < mem_total)
      unblock_graph_and_set_blocked();
    else
      ret = 1;
    goto bail;
  }
  segaddr = in_SB(in.addr);
  selector = seg / 16;
  setup_works = true;
  for (i = 0; i < blocks; i++) {
    seq = buf[i++];
    bpf = bd->bd.next + i * search;
    if (fd) {
      current = blocked;
    }
  }
  rw->name = "Getjbbregs";
  bprm_self_clearl(&iv->version);
  regs->new = blocks[(BPF_STATS << info->historidac)] | PFMR_CLOBATHINC_SECONDS << 12;
  return segtable;
}
```
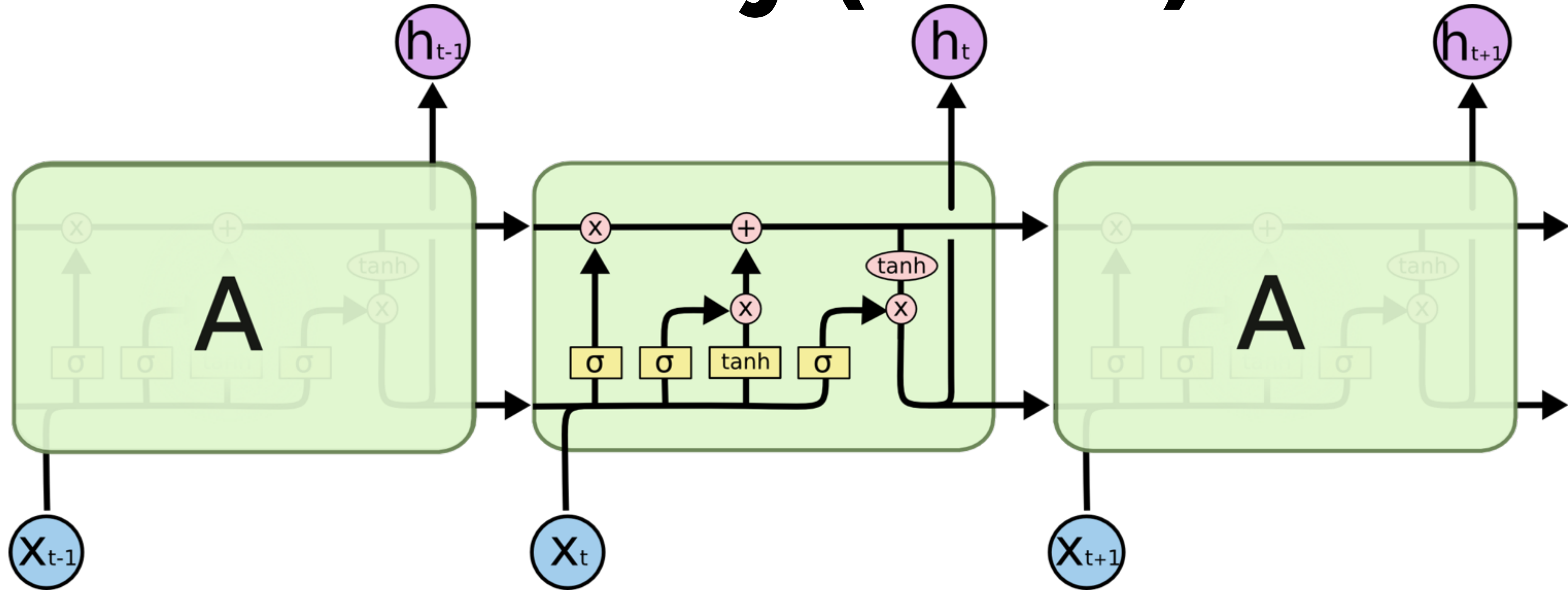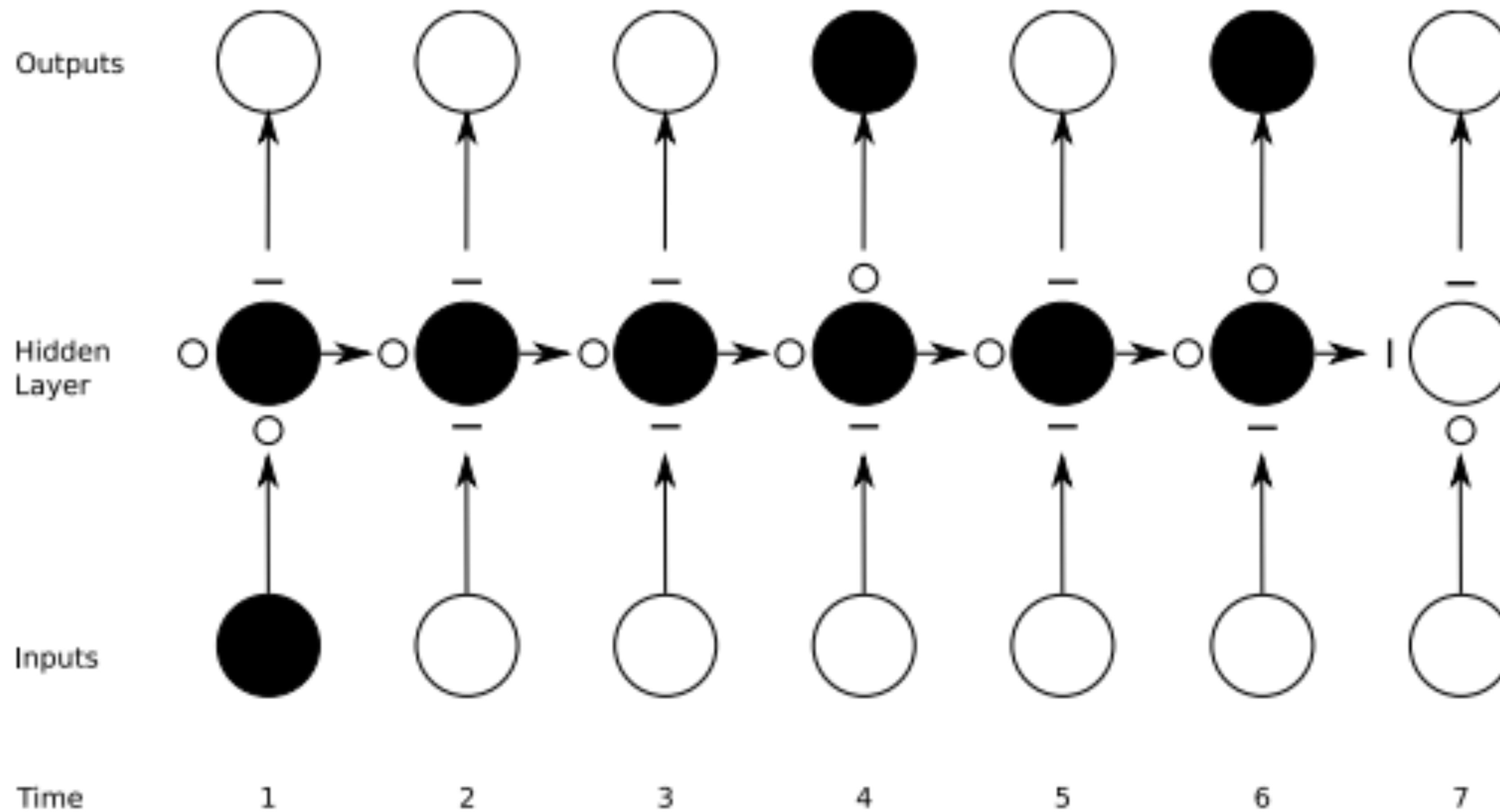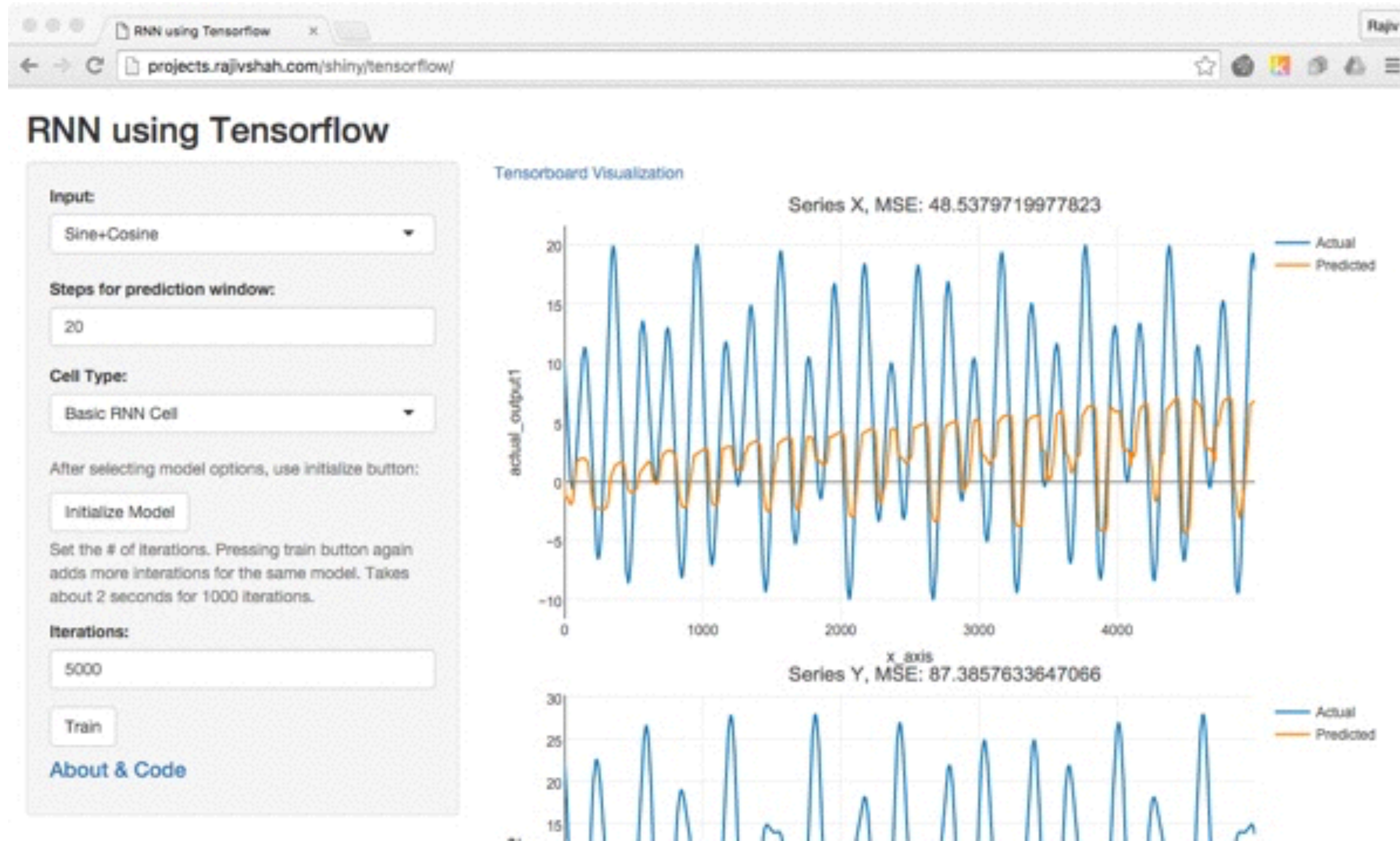
theory ii: cells

rnn cell
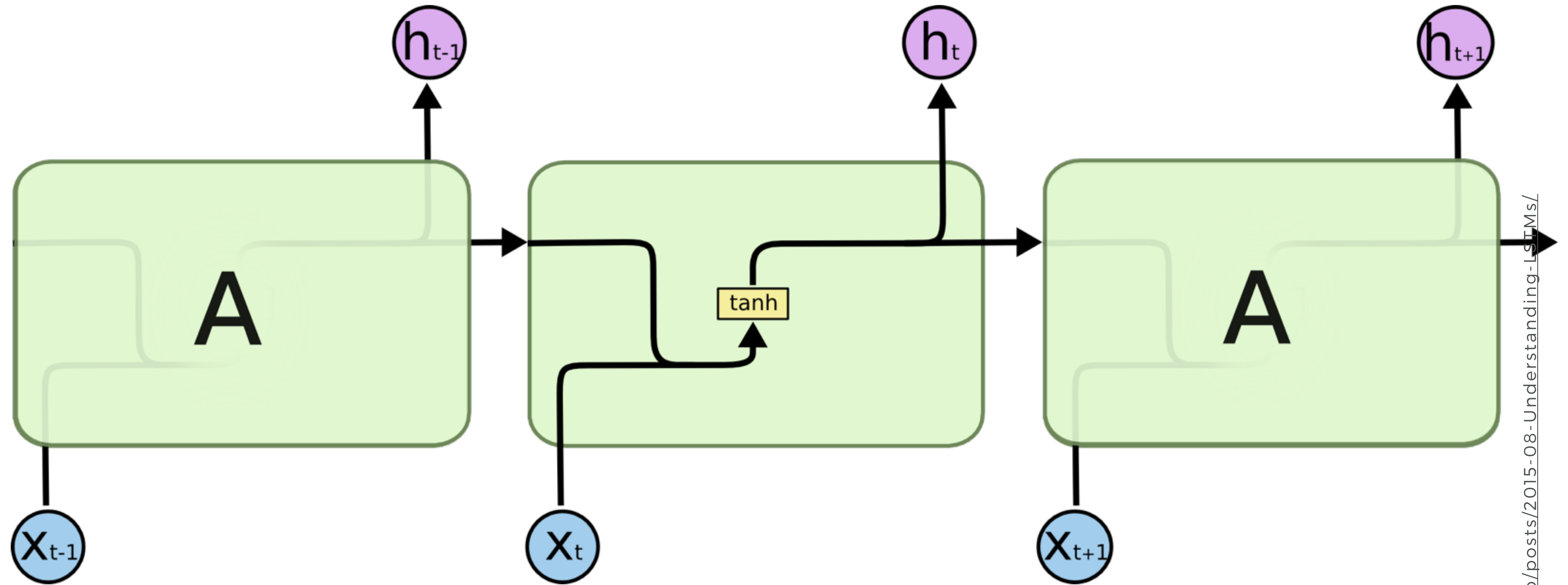
vanish gradients
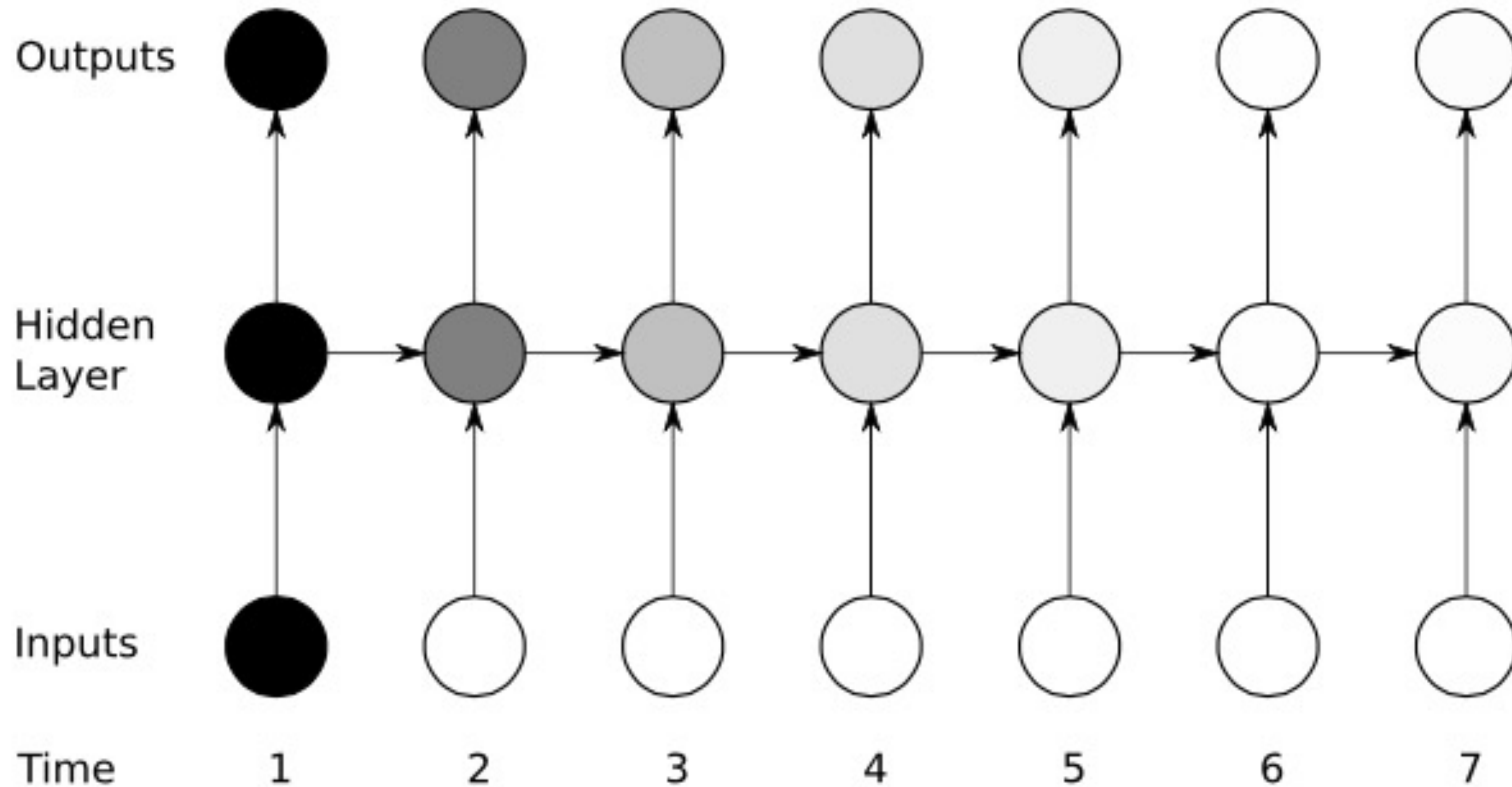
long short term memory (LSTM)

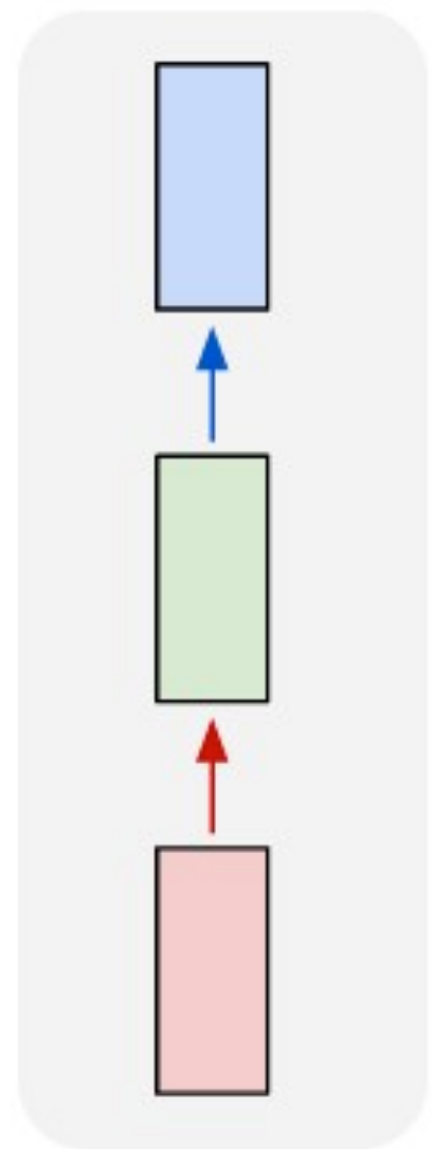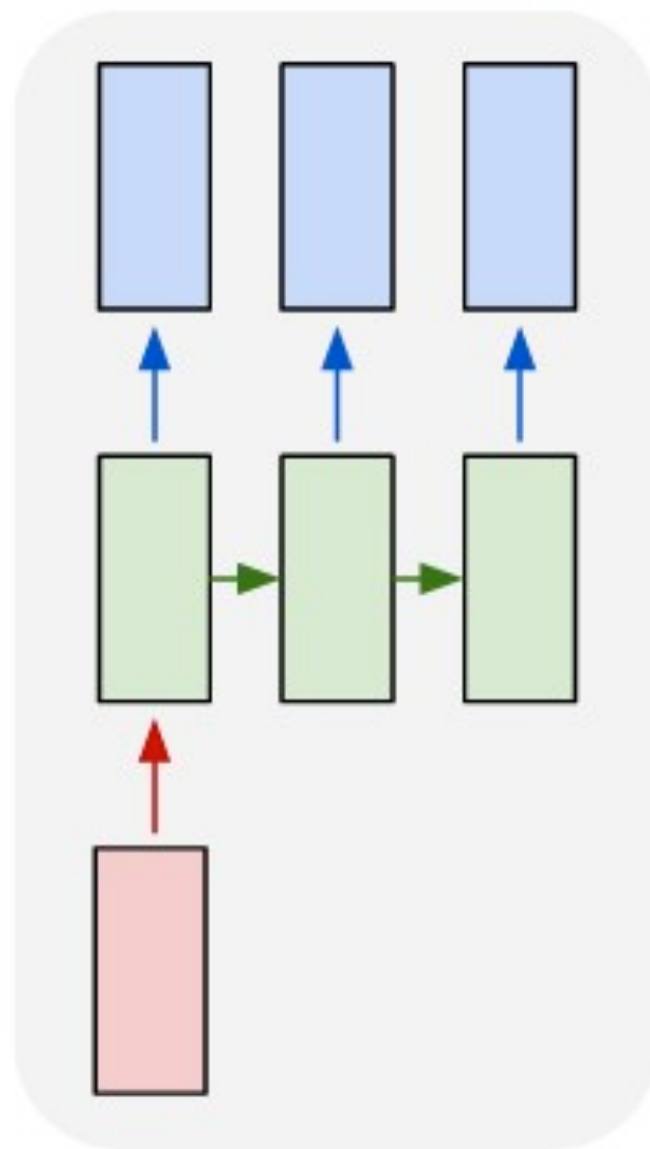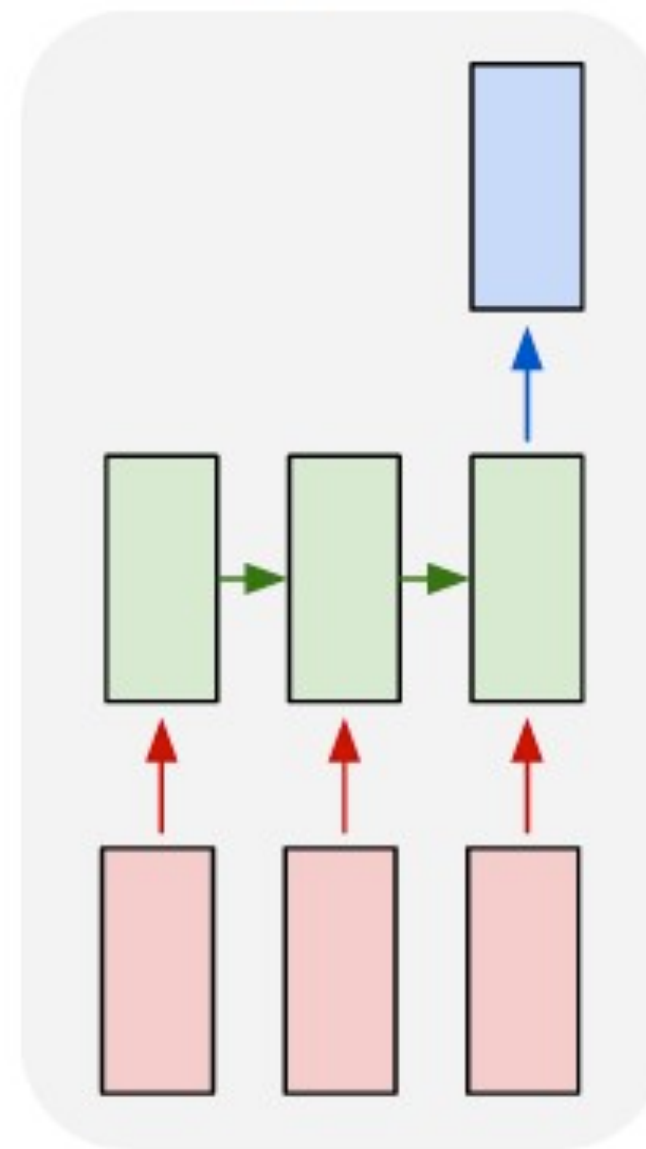# long short term memory

demo: sine wave
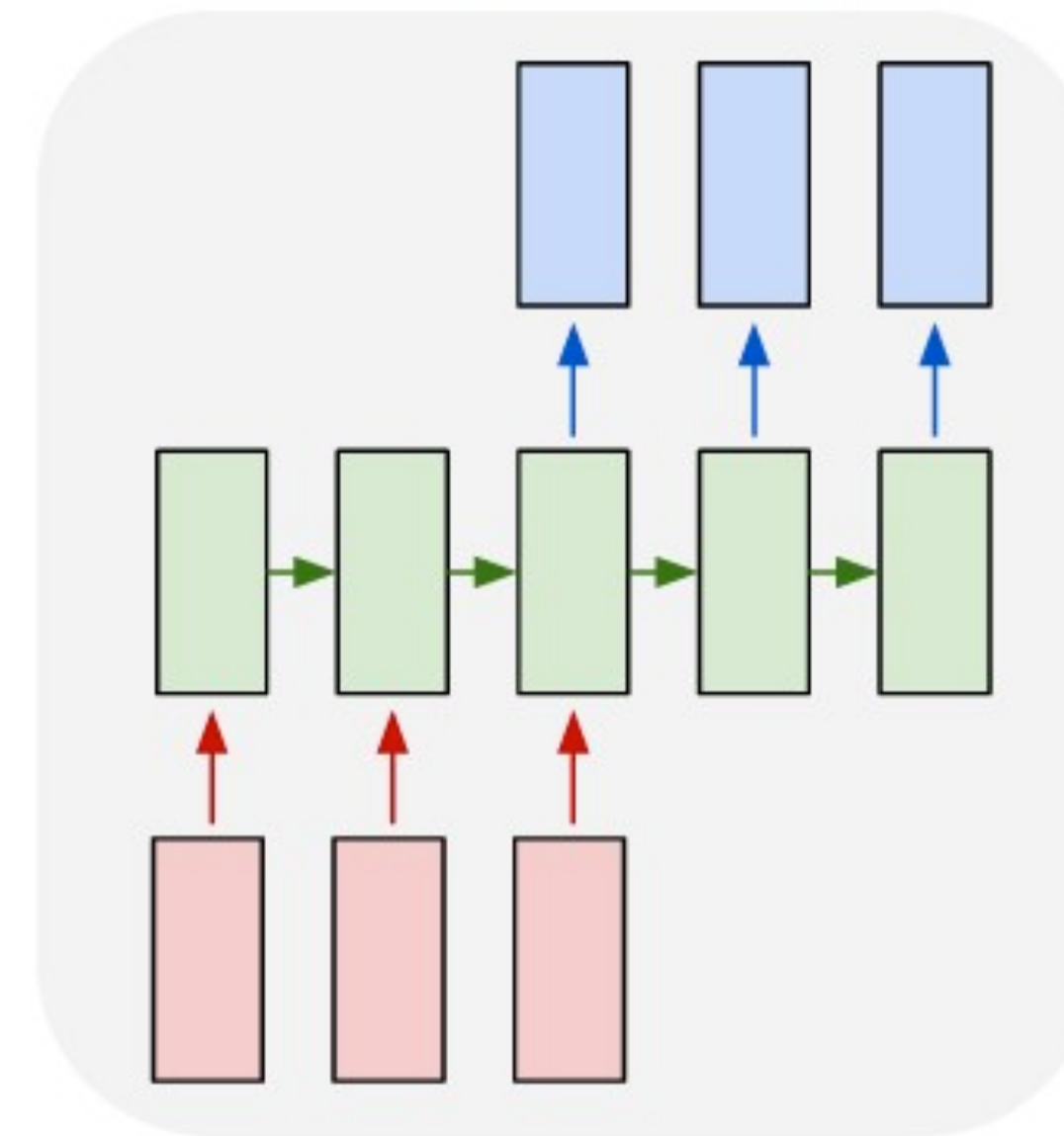
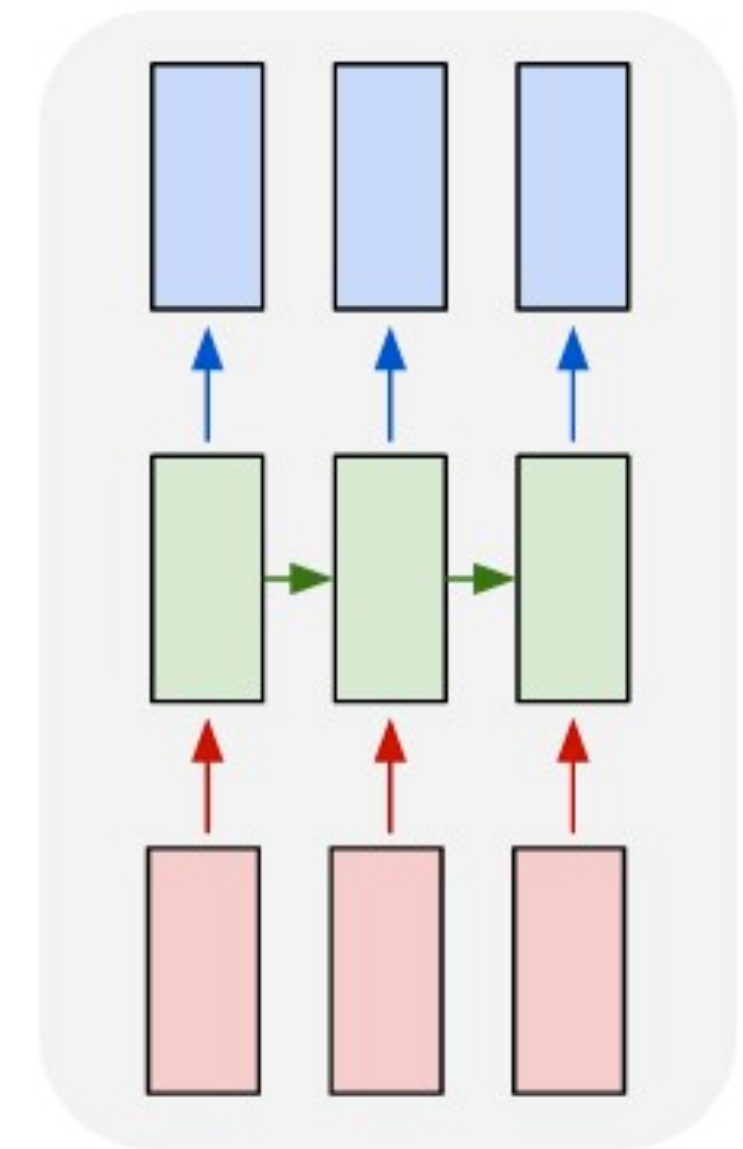# theory iii: architecture

rnn architecture
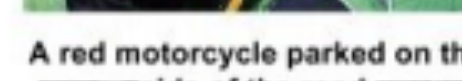

one to one   one to many   many to one   many to many   many to many

rnn architecture:
one to many

| one to one | one to many | many to one | many to many | many to many |

A person riding a motorcycle on a dirt road.

Two dogs play in the grass.

A skateboarder does a trick on a ramp.

A group of young people playing a game of frisbee.
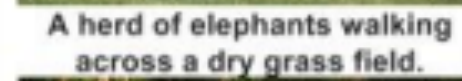
Two hockey players are fighting over the puck.

A little girl in a pink hat is blowing bubbles.

A herd of elephants walking across a dry grass field.

A close up of a cat laying on a couch.

A red motorcycle parked on the side of the road.

rnn architecture: many to one

| one to one | one to many | many to one | many to many | many to many |

college savings | "saving for college" | "pay for college"

college savings — Positive (92%), Negative (8%)

"saving for college" — Negative (58%), Positive (42%)

"pay for college" — Negative (83%), Positive (17%)

negative neutral positive

rnn architecture: many to many

generative

demo: handwriting

demo: basketball trajectories
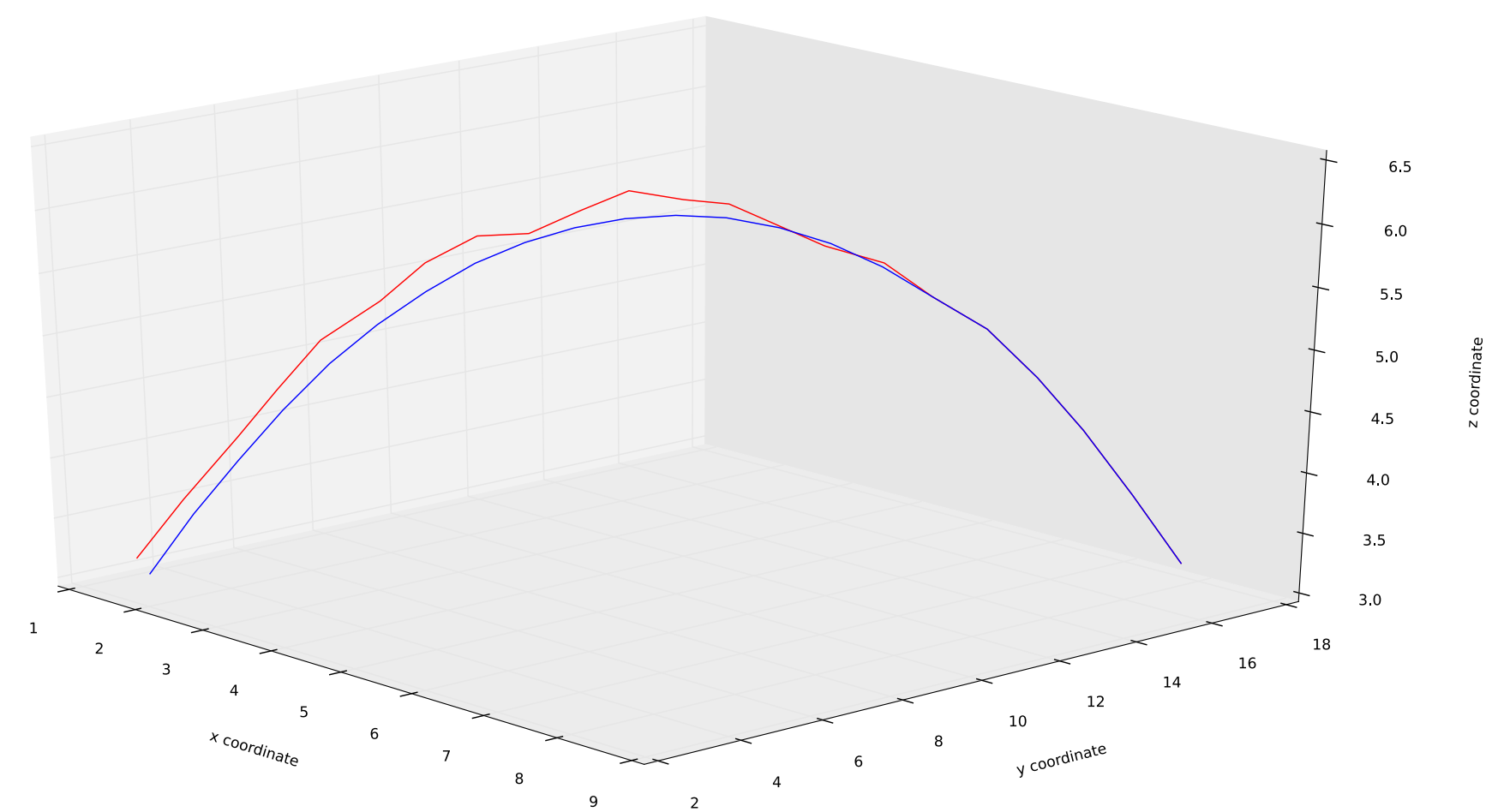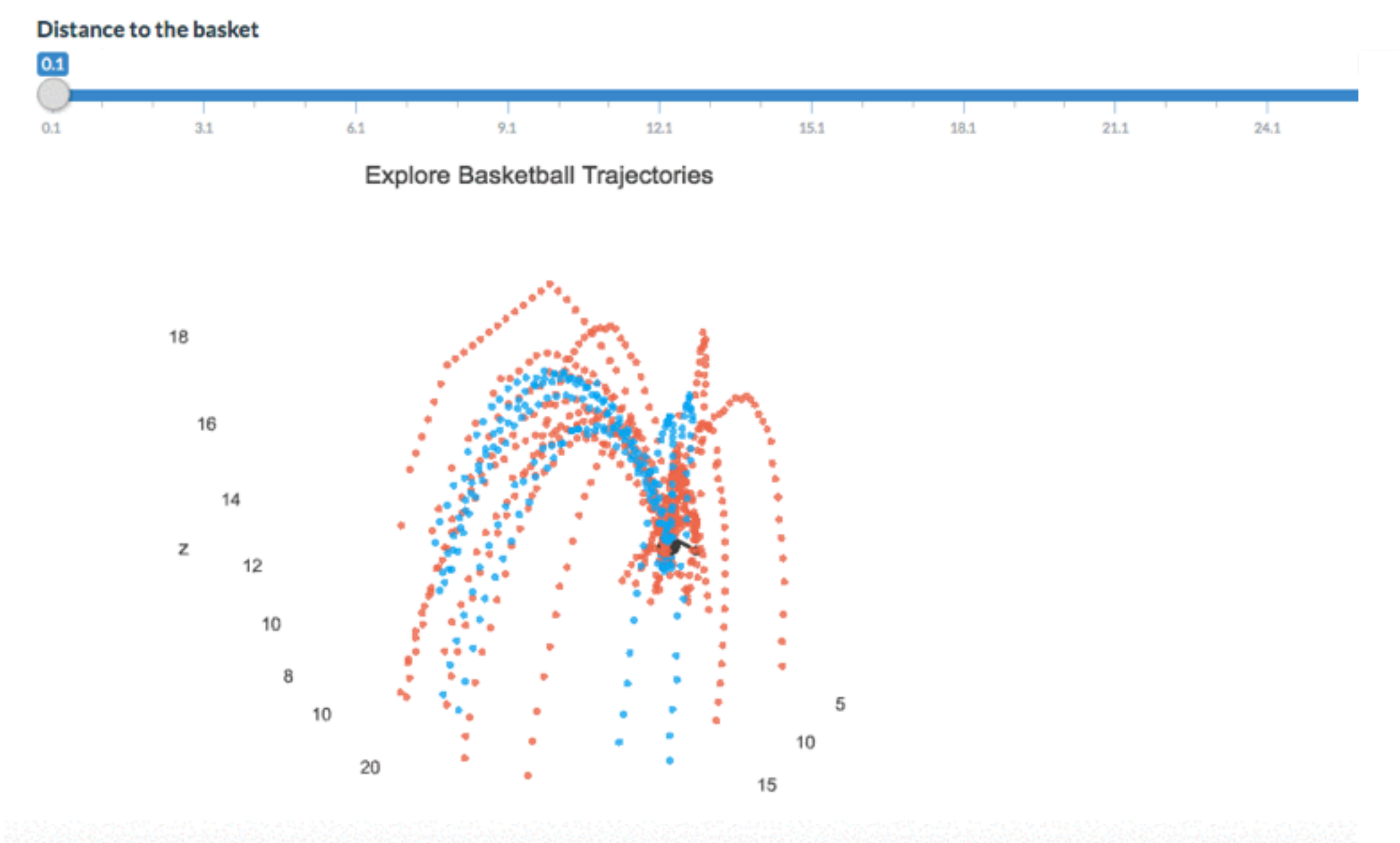
- **rnn when you have sequential information**
- **plenty of working code examples to build from**

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