iSynth

The Quest for a "Better"
Music Synthesizer

Actors

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Department of Electronic Systems
Engineering (DESE)

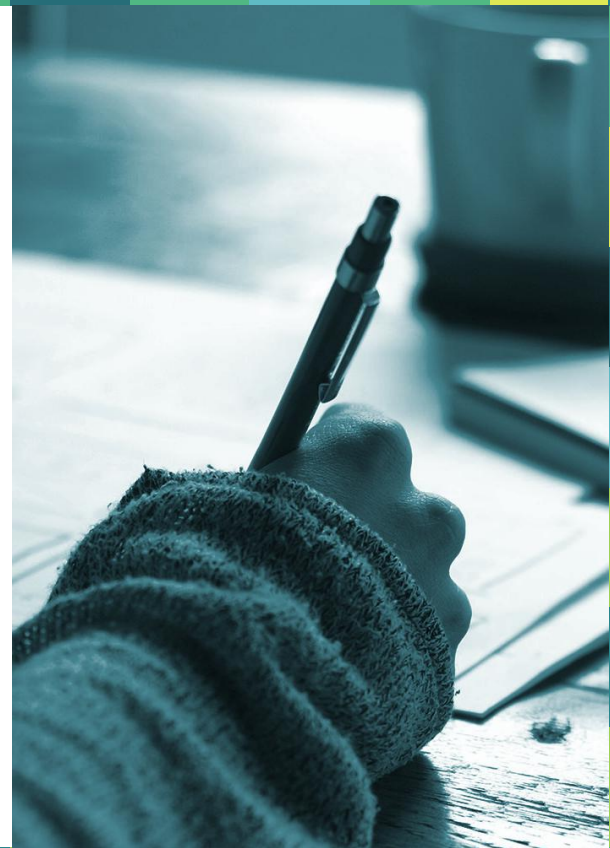Indian Institute of Science

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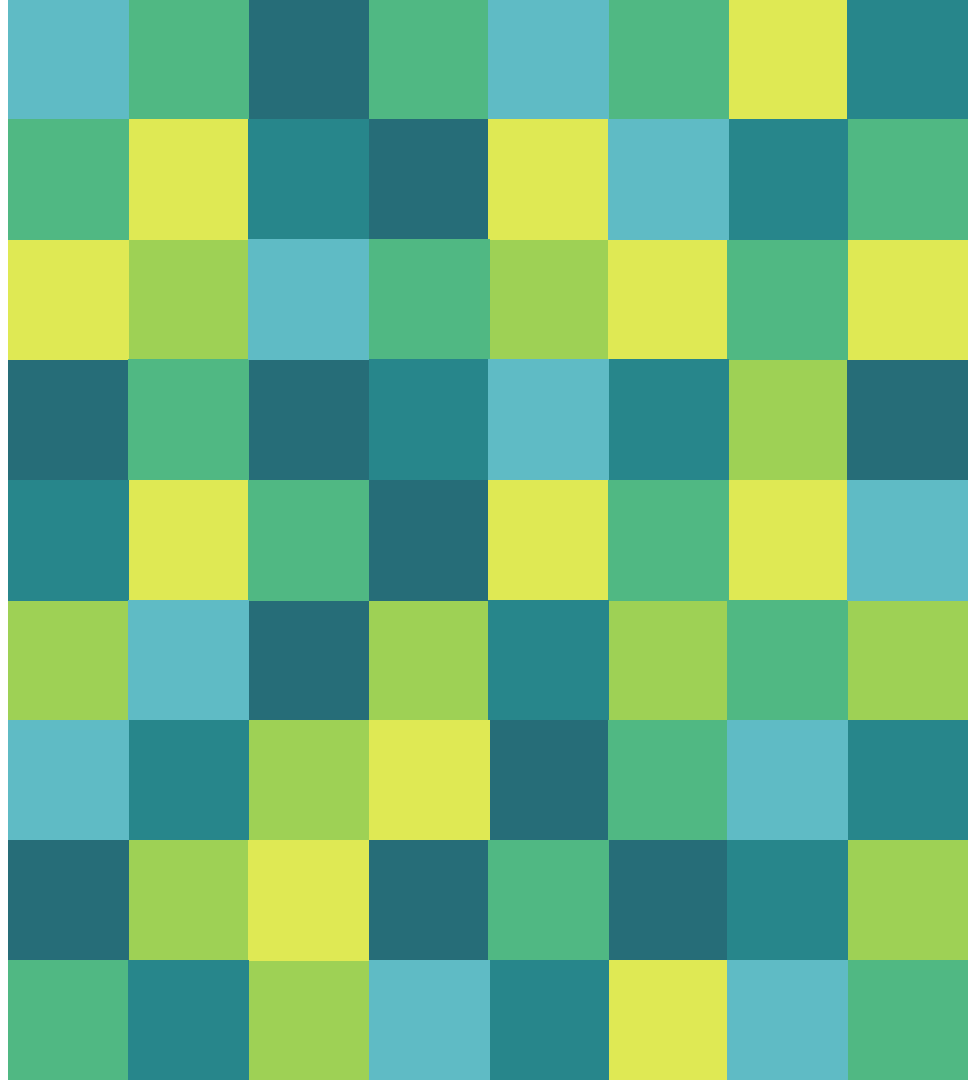
Indian Institute of Science

Bangalore 560 012, India

Agenda

1. **Motivation**
2. **Features of 'good' music synthesizers**
3. **Ideas & Questions**
4. **An inspiration, a case study**
5. **Choice of project scope (??)**
6. **Thanks & Credits**

1.

Motivation

Motivation

1. Keyboard music synthesizers are widely used instruments in the field of music.
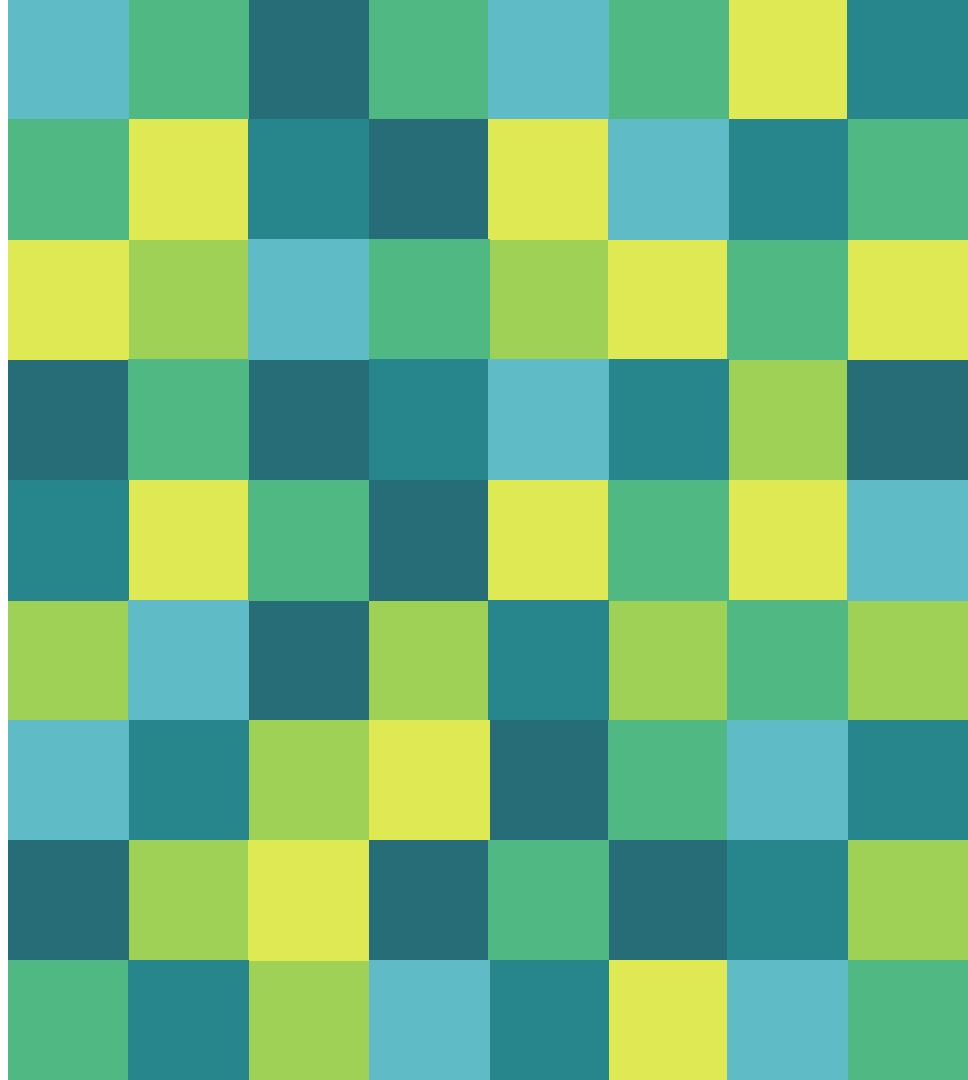
2. There are some issues associated with them :

      - Large size & weight

      - Limited variety of sounds that could be produced by them, often the manufacturer sells alternative models with larger variety of sounds (often at a higher price!)

3. Question : Could we attempt to make the synth more portable and flexible for creative expression ?

2.

## Features of 'good' music synthesizers

Features of 'good' music synthesizers

1. Large and rich variety of sounds that can be produced

2. Modulation of the intensity of sound based on velocity of a key press

3. Pitch bend wheel to vary the pitch in a continuously variable manner.

4. Ability to transcribe & record the music being played or even interface it with a computer for data transfer / song editing.

2.

Ideas & Questions
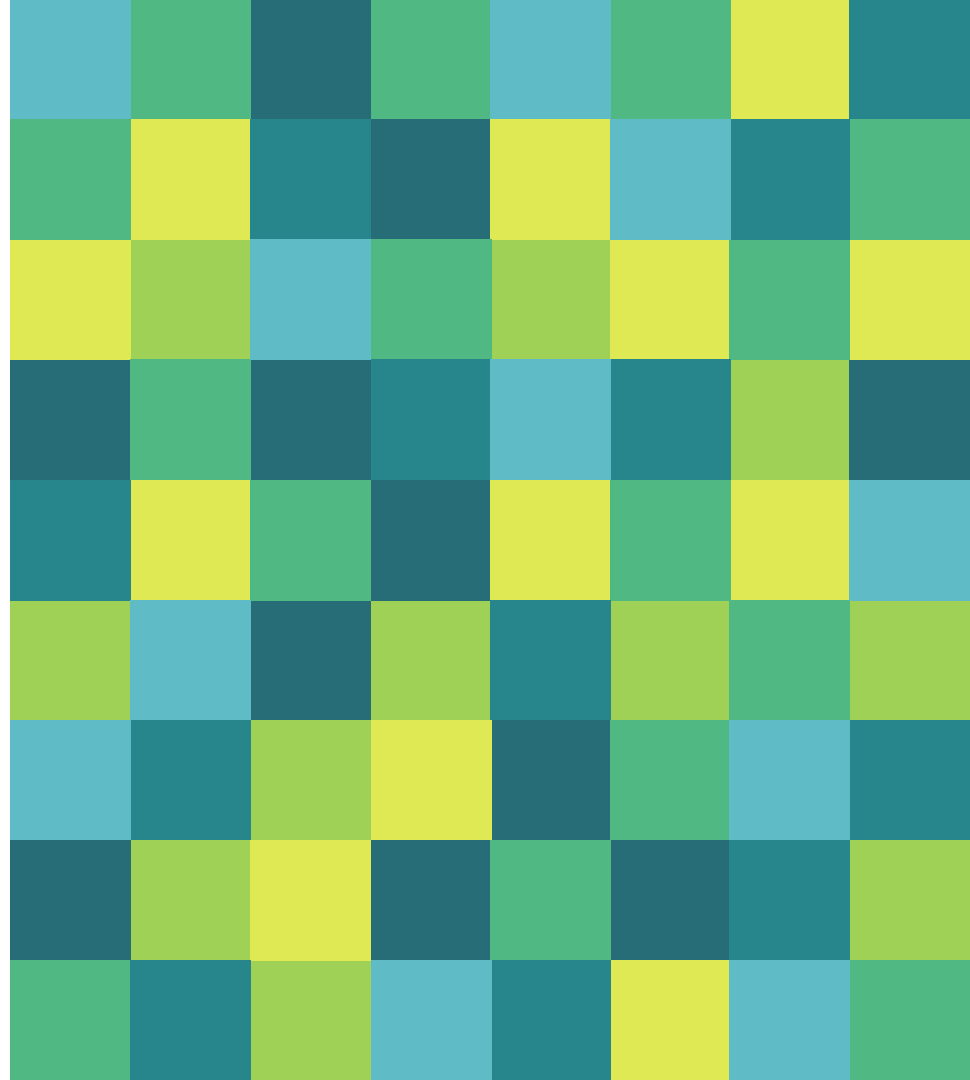
Ideas & Questions - I

I. Could the keyboard be made more portable and modular ?

Idea #1 : {Projector} + {Camera}

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"Pros" :

1. Definitely portable
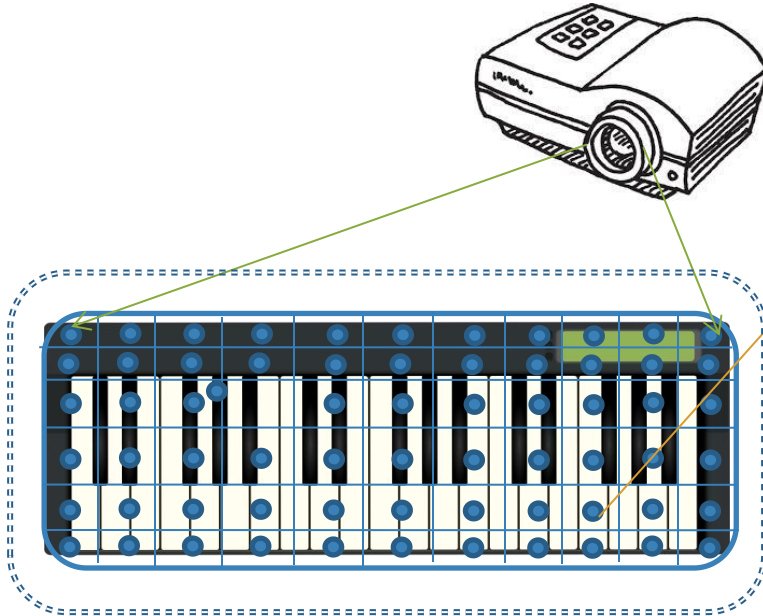2. Can vary the size & number of the keys via software

"Cons" :

1. Feedback ?
2. Velocity of key press ?

Ideas & Questions - II

I. Could the keyboard be made more portable and modular ?

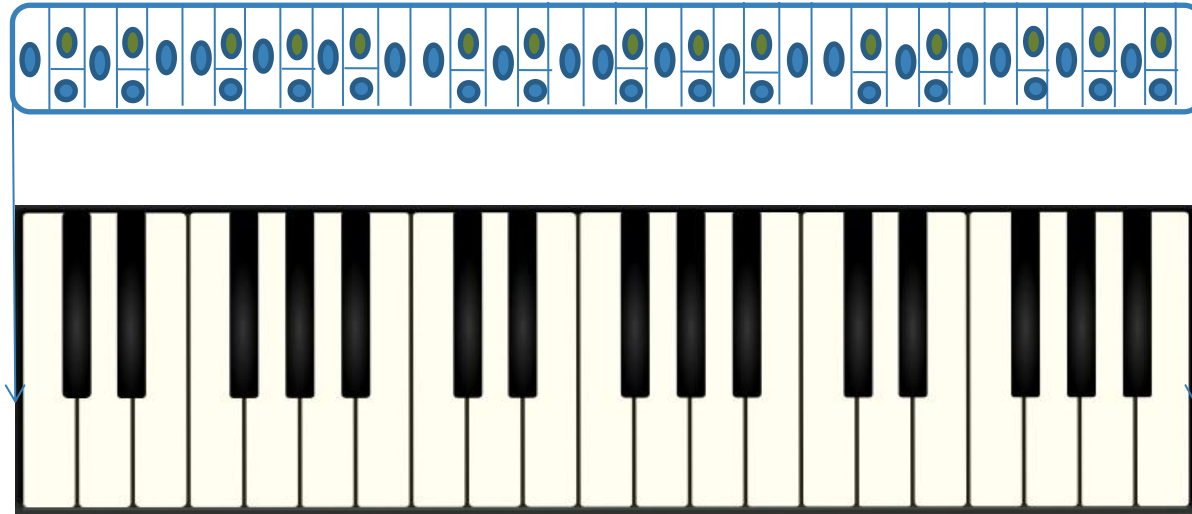Idea #2 : {Projector} +{Foam base & embedded sensors }

Pressure sensors with springs

Grid of sensors with springs with keyboard layout superimposed by the projector

Ideas & Questions - III

I. Could the keyboard be made more portable and modular ?

Idea #3 : {Modular array of directional-light LEDs}+{Foam base & embedded sensors }

- Consumes less power than the projector

- Key width controlled by height from base

Ideas & Questions - IV

I. Could the keyboard be made more portable and modular ?

Idea #4 : {Very very large touchscreen ?!}

- Feedback ?

- Key velocity ?

Ideas & Questions - IV

I. Could the keyboard be made more portable and modular ?

Idea #5 : Touchscreen with tactile feedback !
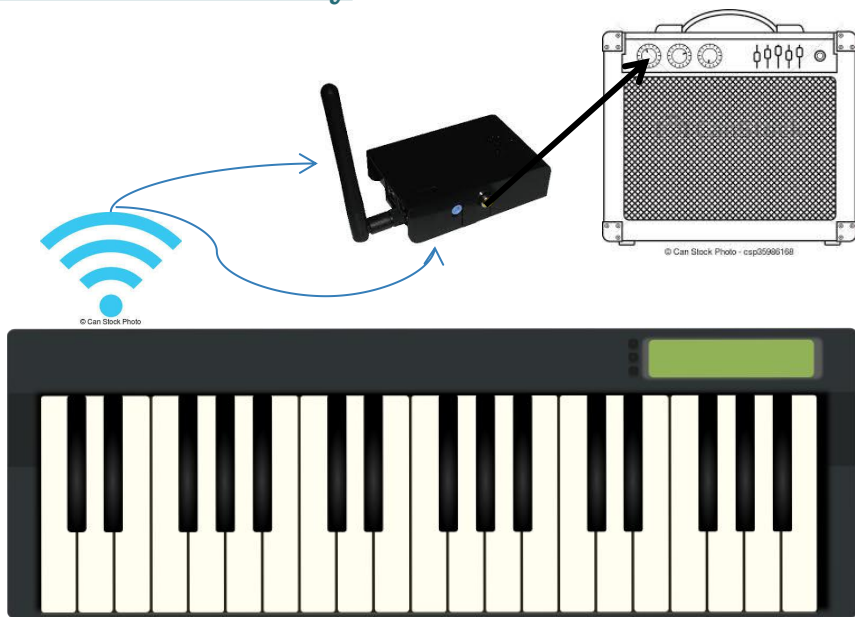

Tactus Technology

Bosch's Neosense

Ideas & Questions - V

II. Could we improve the flexibility of creative expression ?

Idea : Transmit key information wirelessly & reproduce
the sound remotely

- How to handle multi-key presses ?

- Jitter / lag ?

- Communication protocol ?

- Packet format ?

- How responsive is the system ?

Ideas & Questions - V

III. How to synthesize music digitally

Using Python libraries :

- https://stackoverflow.com/questions/6487180/synthesize-musical-notes-with-piano-sounds-in-python/
- https://github.com/bspaans/python-mingus/

From scratch by playing around with Math & Sine waves :

http://www.keithwhor.com/music/

Using MIDI -> sound generation packages :

http://www.fluidsynth.org/

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4.

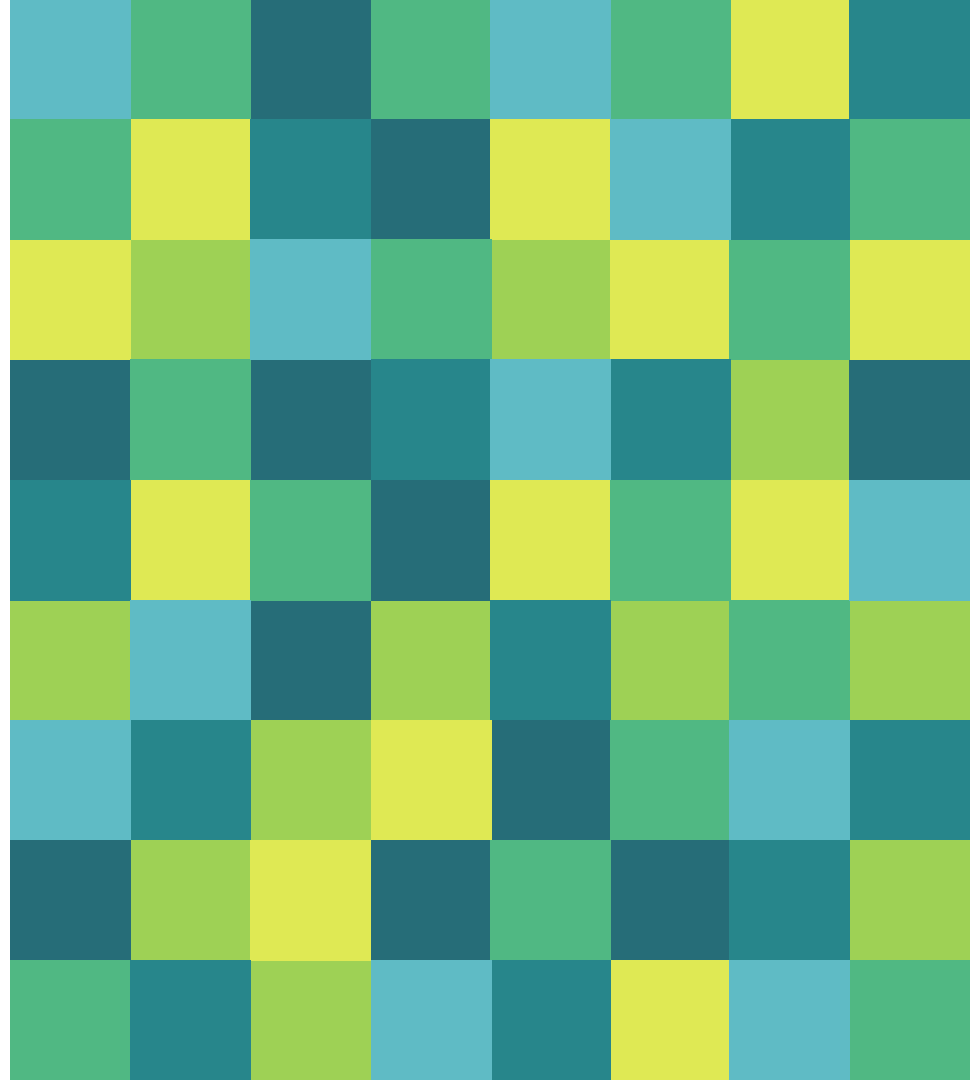A motivating
example
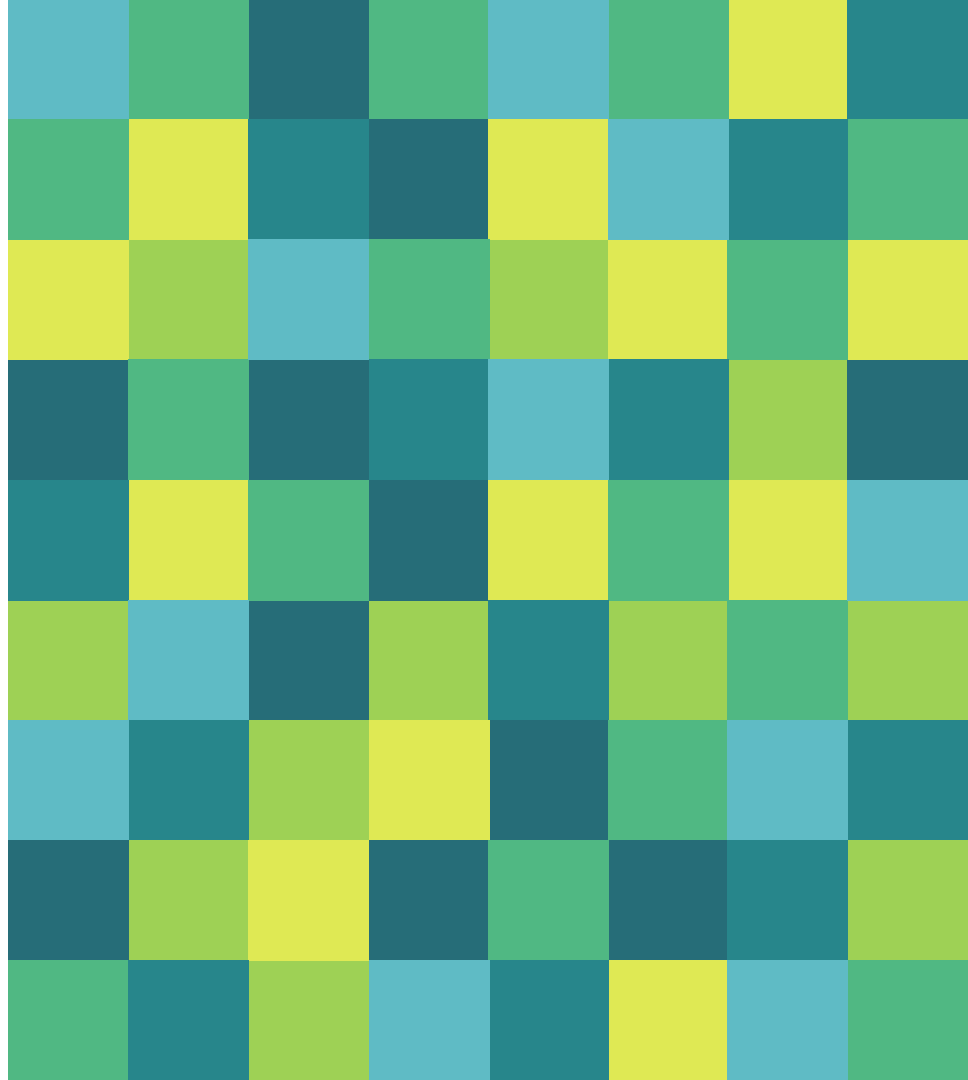
A motivating example - "Seaboard"

4.

Choice of Project Scope

(??)

Thanks!

Any questions?

You can find us at

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    sirishk@iisc.ac.in

Credits

Special thanks to :

- http://www.slidescarnival.com/nym-free-presentation-template/2056

- https://roli.com/seaboard