



# ANN based Performance Enhancement for Campus Free Space Optical Communication Links

Student ; Sadiki Ronewa 3980939

Supervisor ; Dr C.N Nyirenda

# Overview

- ❑ FSOC is a line-of-sight technology that uses a beam of light through the atmosphere to provide a high bandwidth connections[1].
- ❑ Advantages: transmission rate, licensing
- ❑ Challenges: physical obstruction, absorption
- ❑ Focus of project: KORUZA , an **open hardware, open source FSOC system**, for more[5].

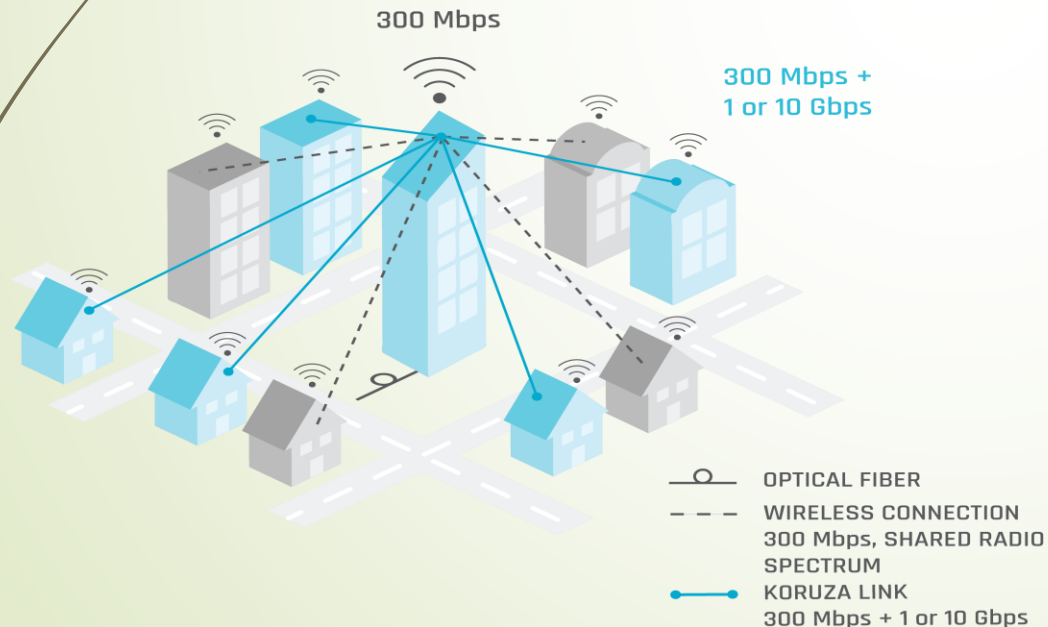
## The problem statement

- Transmission range: currently its between 100m and 150m.
- Need to extend the transmission range to 250m



## Proposed solutions

- Developing an ANN Based bit error correction algorithm. On this case comparing SBRNN[4] and Viterbi[3] detection algorithms to increase the range[2].



## Requirements

### • User requirements

- ❖ Transmission range should increase
- ❖ Transmission bandwidth should not decrease
- ❖ The addition should not consume memory

### • Functional requirements

- ❖ The system should be able to correct errors efficiently at the extended distance.

### • Non function requirements

- ❖ Availability; must respond fast
- ❖ Reliability; must be error free data



- **Software requirements**

- ❖ Python

- ❖ Mat-lab

- **Hardware requirements**

- ❖ FSOC (KORUZA) link; raspberry pi, laser, etc..

- ❖ Extender: poles



## **SIGNIFICANCE OF THE PROJECT**

- Help reduce the implementation cost of FSOC links
  - Create a platform we can eventually start building KORUZA using local accessed materials.
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## References

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2. Farsad, N. and Goldsmith, A., 2018. Neural network detection of data sequences in communication systems. *IEEE Transactions on Signal Processing*, 66(21), pp.5663-5678.
3. Motwani, R.H., Intel Corp, 2018. *Technologies for providing efficient error correction with half product codes*. U.S. Patent Application 15/197,953.
4. Farsad, N. and Goldsmith, A., 2018. Neural network detection of data sequences in communication systems. *IEEE Transactions on Signal Processing*, 66(21), pp.5663-5678.
5. [www.koruza.net](http://www.koruza.net)





Thank you