**FFT/IFFT, Heart Rate Analysis, and Game Development**

1. **FFT/IFFT Audio Signal Processing**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

* Import libraries

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* Generate 3 signals with different frequencies.

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* Combine these 3 signals and plot the combination signal

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* Result

A picture containing chart

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* Compute and plot the power

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Description automatically generated

* Result

Chart

Description automatically generated

* Remove all the high frequencies and plot the signal

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* Result

Chart

Description automatically generated

* Re-Compute and plot the power

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* Result

Chart, histogram

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1. **Heart Rate Analysis**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

* Install “heartpy” package : *pip install heartpy*
* Convert heartbeat file from the format .wav to .csv
* Import libraries

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* Set sample rate



* Get and plot the data from a csv file

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* Result

A picture containing object, antenna

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* Visualize in plot of custom size

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* result

A picture containing chart

Description automatically generated

* Display computed measures

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* Result

Text

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1. **Game Development: Red Alert**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

* Import libraries

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* Declare constants

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* Background music

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* Declare global variable and keep track snowflakes

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* Draw the snowflakes

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* Define the update() function

Text

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* Make the snowflakes

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* Add placeholders

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* Create the snowflakes

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* Place the snowflakes

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* Animate the snowflakes

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* Game over

Text

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* Handle mouse clicks

A screenshot of a computer

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* Click a red snowflakes

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* Stop the animations

Text

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* Display messages

Text

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* Suffle mode

Text

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* Run the code and the main playing screen showing below

A picture containing text

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