The effect of distance to SPL on various keyboard types

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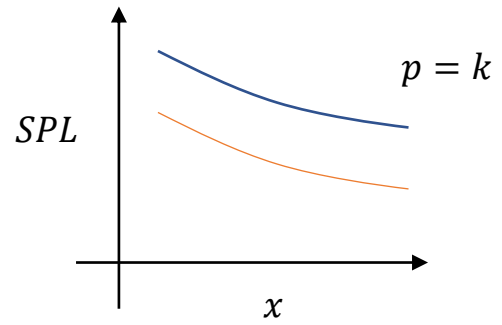
Motivation

- Nowadays, mechanical keyboards have become the go-to keyboard for many people and have replaced the old membrane keyboard.
- However, one of the main quirks of mechanical keyboards is the noise generated from the switch unlike that of membrane keyboards.
- So, it is important to determine the difference in noises generated from these two keyboard types.

Objective

Objective Statement	Objective Functional Form	Objective Graphical Representation
To observe the relationship between distance (x)and SPL (SPL) on various keyboard types (k)	$SPL = f(x; k; -)$	

Experimental Conditions and Scope

Experimental Condition

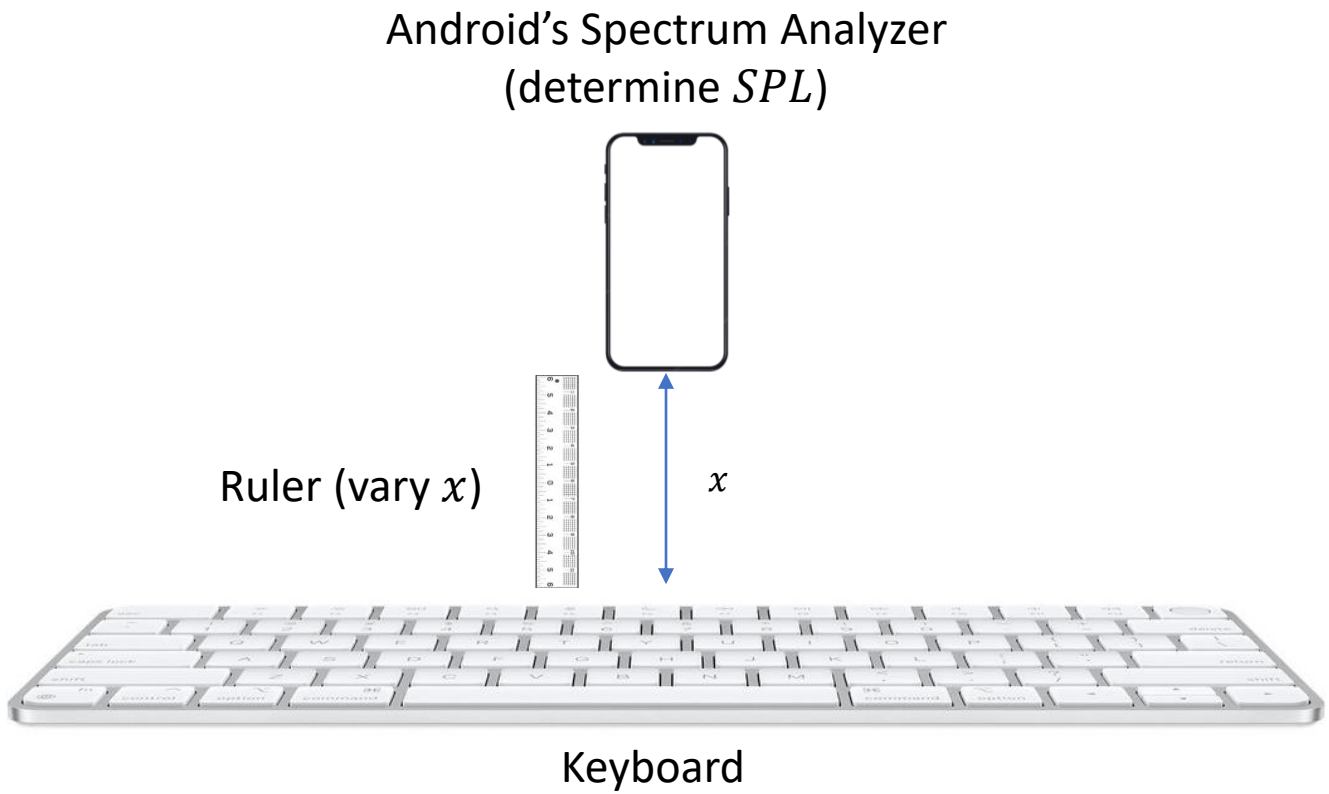
- Fixed recording application
(Android's Spectrum Analyzer running on Huawei mate 10 Pro)

- Keyboard types: membrane (Lenovo Legion 5 2021 built-in keyboard) and mechanical (Corsair k70 red switch)

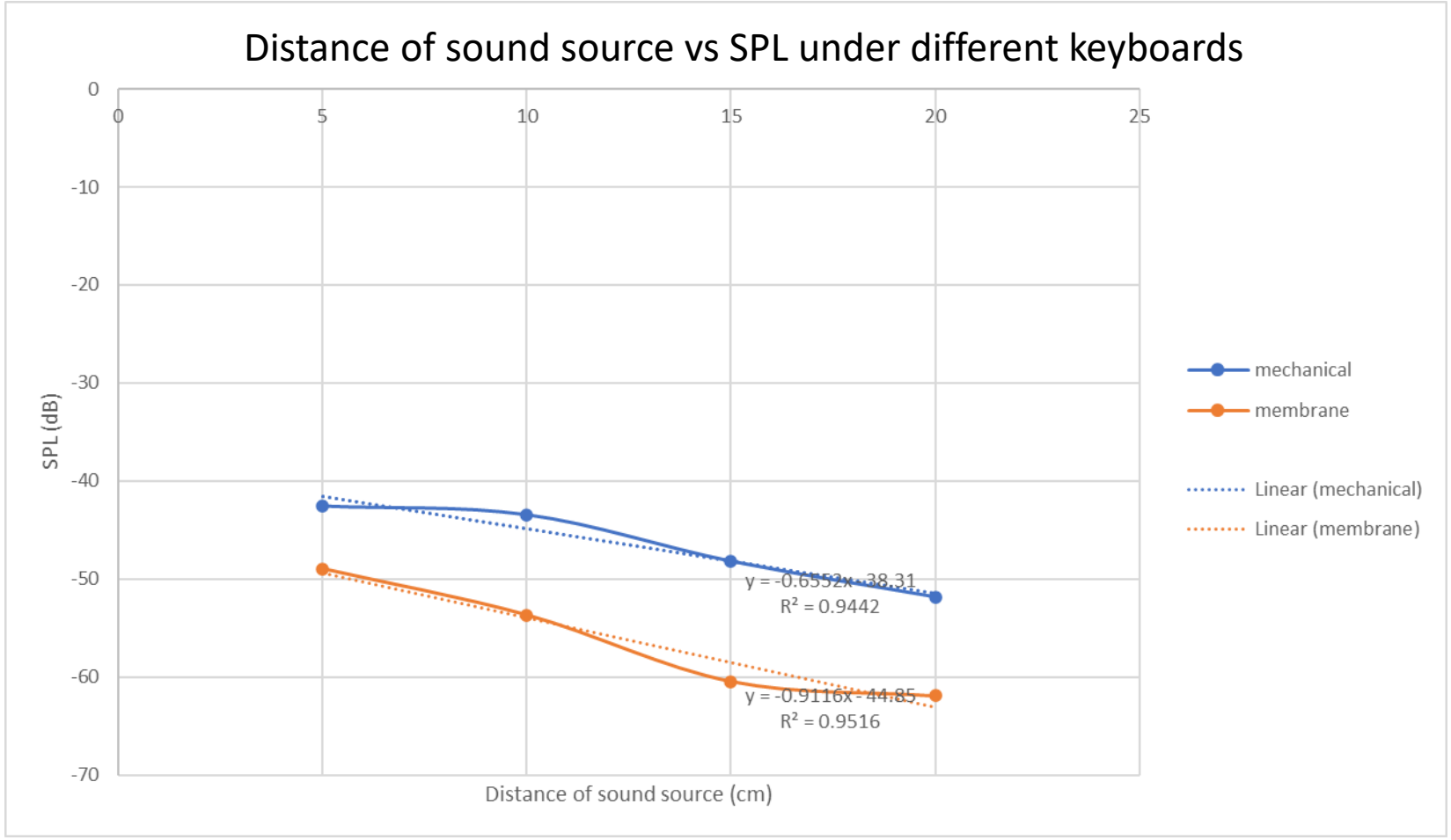
Experimental Scope

- $x_{min} < x < x_{max}$,
$\Delta x = 5\ cm,$

Experimental Principle and Setup



Result


Distance of sound source vs SPL under different keyboards
0
-10
-20
-30
-40
-50
-60
-70
SPL (dB)
0
5
10
15
20
25
Distance of sound source (cm)
y = -0.6552x - 38.31
R² = 0.9442
y = -0.9116x - 44.85
R² = 0.9516
mechanical
membrane
Linear (mechanical)
Linear (membrane)

Discussion

- The measuring application ‘Spectrum Analyzer’ has significant amount of noises which could be from the environment and the hardware device.
- The noises greatly affect the measurement.

Conclusion

- The relationship between distance to SPL is inversely proportional.
- Moreover, the type of keyboard also has an effect on SPL.