

**IMPLEMENTATION OF ARTIFICIAL NEURAL NETWORKS FOR
ANALYZING THE INFLUENCE OF FORCE ON ACCURACY PROJECTILE
RANGE OF 76 MM MUNITION/ TRK**

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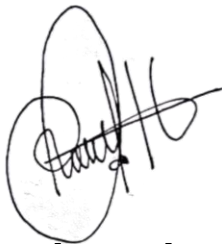
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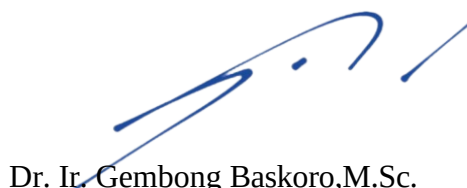
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ABSTRACT

IMPLEMENTATION OF ARTIFICIAL NEURAL NETWORKS FOR ANALYZING THE INFLUENCE OF FORCE ON ACCURACY PROJECTILE RANGE OF 76 MM MUNITION/ TRK

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This research explains how to determine the range of a 76mm ammunition projectile considering the drag force that affects the 76mm cannon ammunition projectile when fired, aiming for accuracy in hitting targets. Firing a 76mm cannon at a target is always preceded by a reconnaissance shot to determine the precision level of the 76mm cannon itself, thus making this ammunition type quite inefficient in terms of quantity. This happens because several factors affect the projectile speed in the air, one of them is the drag force. The method used to analyze the drag force effect on the 76mm cannon projectile shot is the forecasting method using artificial neural networks with a ballistic calculation approach. The shots aim to determine any deviations in direction, distance, and target. These deviations always occur with each 76mm cannon shot, even when using the cannon's firing data table. The 76mm cannon itself and all its weapon systems are still very conservative, relying on human ability and precision, which significantly increases the likelihood of human errors. Therefore, this research aims to make decisions based on standard military data in determining the 76mm cannon firing range through drag force using the Artificial Neural Networks (ANN) methodology. The methodology used involves collecting data from dummy ammunition tests using a wind tunnel, thus obtaining lift force and drag force data from several angle and wind speed variables. Then, we use the ANN in Matlab to train and test this data, resulting in the Mean Square Error from the ammunition test data. After that, we look for coefficients from each drag force data that become one of the variables to find the predicted firing range data using mathematical and physical derivative formulas, resulting in the predicted range data for each angle.

Keywords: Artificial Neural Networks, 76mm Cannon Ammunition, Artillery 76mm Drag Force, ANN on 76mm Projectile

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DEDICATION

I dedicated this work to the Indonesian Armed Forces, my Parents, and my Family, who always encourage and inspire me, patiently wait, and give the best prayers for my struggle.

Be joyful in hope, patient in affliction, faithful in prayer.
(Romans 12 : 12)

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Praise and gratitude to Jesus Christ for all blessings and guidance so that until now, they are still given the opportunity and health. By His will, the writer can also complete the preparation of a proposal for the thesis.

The author realizes this thesis proposal is still far from perfect, so the writer is open to constructive criticism and suggestions. Hopefully, this thesis proposal can be useful for Swiss German University students in general and Mechanical Engineering (Mechatronics) students.

Tangerang, July 2023

Armando Hasudungan Hutagalung

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