***Automated Equity Portfolio Management Using Techno-Funda Analysis: A Python-Based Approach***

Abstract— This paper presents an experimental research study on integrating fundamental and technical analysis—"Techno-Funda" analysis—for automated equity portfolio management using Python. The implementation leverages the Spyder development environment within the Anaconda Navigator Package. The study focuses on stocks listed on the National Stock Exchange, India; specifically, those included in the NIFTY100 index. The portfolio building process starts with preparation of two datasets: (i) Financial metrics including Revenue, Earnings per Share (EPS), Price to Earning (PE) ratio and Earnings Before Interest, Tax, Depreciation and Amortization (EBITDA) obtained from historical financial statements and (ii) Historical stock price data sourced from Yahoo Finance's API. The methodology involves screening of stocks based on earning’s Compound Annual Growth Rate (CAGR) projections and Price-Earnings (PE) ratios. The ranking of stocks is carried out using EBITDA margin. Utilizing Efficient Frontier analysis, optimal portfolios are identified based on risk-return trade-offs. Monte-Carlo simulations are carried out to generate diverse portfolio combinations, visualized through the Efficient Frontier. The fundamentally screened stocks get weight allocation based on maximization of Sharpe ratio. The technical analysis indicators viz. Exponential Moving Average (EMA) crossovers and Average Directional Index (ADX) slope on daily time frame are used to decide entry price of every stock selected for portfolio. The technical indicators also keep track of exit signals for all stocks already within the portfolio. The process manages portfolio dynamically in continuous close-loop by automatically updating fundamental screening, technical entry/exit signals and optimum weight allocation. The performance evaluation of portfolio is done using Extended Internal Rate of Return (XIRR) and compared with different bench marks.

Keywords— Portfolio Management, Technical Analysis, Fundamental Analysis, EMA, ADX, XIRR