Stock Market Trading with LSTM Analysis

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I. Dataset Creation

II. Training

A. Config

1) Load: Load config as json object with path from positional arg

2) Unpack: Unpack config keys into variables

B. Load dataset

1) Init dataset object: The dataset object is initialized and given config. Then the load dataset method is called which does the following.

2) Verify files: Loads all csvs in dataset and verifies a minimum length. A legacy feature at this point.

3) Split files into task groups: List of valid files is split into groups to have each group loaded with threads.

4) Open dataset thread pool: Open thread pool to load files.

5) Load csv files: Open every file from directory listed in config. Load as pandas dataframe with date index column and put them all in a list.

6) Calculate indicators: Calculate all additional features listed in configs. Cut out any data at the front of the dataframes that is missing these features (e.g. for rolling avgs).

7) Create date feature: 1hot encode day of the week and add the new weekday features to all dataframes.

8) Slice data into training examples: Use rolling window to cut each dataframe into training example dataframes with n day history. All examples get added to a list and labels are made into a dataframe of their own.

9) Normalize examples: Each dataframe training example is normalized using norm function from config.

10) Create tensor input: Each dataframe is converted to numpy then a tensor with the datatype and device listed in the config. All labels are converted a single tensor as well.

C. Load Model

1) Dynamically load model class: The Python file containing the model class is loaded by name using importlib.

2) Call init: Init custom model class. The custom model class is passed a name, starting LR, and input feature count from dataset. The model inherits from torch.nn.Module which is also inited.

3) Setup pytorch objects: Model class init sets up LSTM object and Sequential object for forward passes, a default optimizer, a null loss func and an empty history.

4) Set optimizer: Call model set optim method to initialize and save optimizer to model class.

5) Send to device: Set model to device specified in config.

D. Scheduler

1) Init scheduler: Pass optimizer from model. Give it kwargs from config

E. Dataloader

1) Check for test set: Check's to see if the model save config contains test set indices. For loading a partially trained model. Indices get set after init if none are there. Pretty much a vestigial feature.

2) Call init: Init object and pass in dataset object (and test set indices if applicable)

3) Pick test indices: If not test set indices were passed, create list of indices and either random sample indices (legacy) or slice chunk off the front to create test set indices.

4) Seperate test set: Use indices to make a mask and remove test examples from all indices to get training set indices

5) Shuffle train set: random.shuffle train set indices

6) Split batches: Split train set indices into batches using a list comprehension and slicing with option to drop last partial batch. Transforms list[int] -¿ list[list[int]]. Casts result to tensor.

7) Setup first inputs: Create empty list for inputs and labels. Prefetch first n batches by indexing them out of dataset and adding them to inputs and labels. Remove these indices from batch indices.

III. Evaluation